

THE VETERINARY MAGAZINE

A JOURNAL FOR THE PRACTITIONER, AND FOR THE ADVANCEMENT
OF COMPARATIVE MEDICINE.

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THE
VETERINARY MAGAZINE.

VOL. III.

OCTOBER, 1896.

No. 10.

THE DANGER OF TUBERCULAR INFECTION FROM
COWS' MILK, AND ITS PREVENTION.*

By B. H. DETWILER, M. D.,
Williamsport, Pa.

"In 1782 the City of Naples enforced sanitary laws with the intention of stamping out tuberculosis. They required the registration of all consumptives, also inventories of clothing, some of which was destroyed, with disinfection and replastering of houses." These methods were based on empirical grounds, yet in the next half-century tuberculosis was reduced fully fifty per cent. One hundred years later Robert Koch presented a complete demonstration of the cause of this dread disease; he demonstrated that a particular bacterium, the bacillus tuberculosis, was the cause, and that the sputa of consumptives gave rise to more than fifty per cent of the cases.

Many of you will recall the case of Mr. E., who had his shop on West Fourth street, a quarter of a century ago. He was a hale, sound man, but had in his employ the Robinson brothers, who worked in a small, closed room and expectorated around the stove. Mr. E. justly claimed that his subsequent infection with tuberculosis was due to that cause, which is now accepted.

It is only within recent years that the profession has come to regard milk as an important item in the etiology of this disease. Sternberg says: "A more common mode of infection, especially in children, is probably by way of intestinal glands from ingestion of milk of tuberculous cows." Infection from this source has been proved, and the bacilli found in milk by

* Read before the Lycoming County Medical Society, July 7, 1896.

such careful experimenters as Bollinger in Germany, and Dr. Ernst in Boston. This revelation of bacilli of tuberculosis in the milk of cows is of recent date. Formerly, when the disease was considered purely hereditary, it was a visitation of God. Now, since we can demonstrate that one source of danger is in tuberculous cows, it is self-evident that this source of contagion should be stamped out by destroying those cows that the tuberculin test shows are contaminated.

Dr. Shakespeare, of Philadelphia, states that "Fully one-fifth of all the deaths of infants and children feeding on ordinary milk are due to tuberculosis, commencing in some part of the digestive tract." This may be a high percentage. Dr. Hamaker, of Meadville, Pa., states that since tuberculous cows have been eliminated from the herds supplying the city with milk, there is less disturbance of digestion of the children than formerly; with a population of 12,000 last season there were only two deaths from cholera infantum. The question will present itself: If milk from cows is dangerous, how is it that we have used it with impunity for years? The reply will be that it may not have been so innocuous as we have imagined. Only the sputum of consumptives reproduces this disease, and the milk of consumptive cows is dangerous only when the udder becomes involved, but one diseased cow will infect a whole herd. While tuberculosis is infectious, it is only mildly so. It is not like measles or whooping-cough, yet it is infectious.

In the wards at the Hospital for Insane, at Danville, Pa., all tuberculous inmates are kept together, and there has been only a few deaths from tuberculosis in that institution in comparison with institutions where it is not considered infectious.

Formerly California was the only hope of consumptives. Its equable climate and freedom from bacillary infection made it for years the Mecca for this class of sufferers. The same results were secured at Denver and El Paso; but this same dry climate and the high winds disseminated the bacillus of tuberculosis expectorated by the consumptive upon the street and wherever convenient, until there is now as great mortality there as at other places.

The plan that appears to me most feasible in the light of our present knowledge is, to destroy all tuberculous cows, and instruct all tuberculous people that they must not expectorate

on the streets or cars, or in any place where the sputum may be incorporated in the floating dust by evaporation and inhaled. I desire to submit communications from Drs. McLain and Hamaker which present exhaustively the method of exterminating bovine tuberculosis. Dr. McClain writes:

In reply to your communication asking my opinion as to the use of tuberculin as a means of diagnosis, and its results, and the method of dairy and milk inspection of our City Board of Health, would say, after a thorough test and from a large experience, I am satisfied that the judicious use of tuberculin is the best and surest method to eradicate tuberculosis from the bovine race, providing the same methods for extinction could be adopted in the human race, but so long as we have tuberculosis in one family, just so long will we have it in the other. The percentage in cattle will be greatly decreased, but we must have more legislation and aid from cattle-breeders to enable the veterinarian to accomplish what the profession could do under more favorable circumstances. I think there has been needless destruction of valuable breeding animals in which the tubercular lesion was encysted and practically without danger. I have seen cases where the process of calcification had occurred, but the pathological changes and the different organs invaded by the bacilli render them so dangerous to have about, that it is better to destroy a few that are not dangerous than to allow one to escape. I have never had any serious results following the use of tuberculin. I think the greatest danger of infection is when there are tubercular deposits in the udder. In regard to the method of dairy and milk inspection of our Board of Health: It is a plan suggested by myself that every vendor must have a license, and, in order to obtain the same, must make application to the milk-inspector for a certificate of inspection. This inspection consists of an examination of all cattle, food, water and dairy utensils. There must be a separate milk house, independent of dwelling or stable, and nothing but clean cattle are allowed to be milked. The milk is tested from time to time, to see that it is kept up to standard— $3\frac{1}{2}$ per cent butter fats, $12\frac{1}{2}$ per cent solids. I send you this day rules and regulations of our Board. Please look over the milk rules, etc.

Yours, etc.,

C. COURTNEY MCLEAN.

Meadville, Pa., June 29, 1896.

MEADVILLE, PA., June 29, 1896.

DR. B. H. DETWILER, Williamsport, Pa.:

Dear Doctor :—Complying with your request, I wish to say that we have had quite an energetic health board in Meadville, who have tried to bring the health department of our city up to modern standard. They have paid especial attention to the purity of the milk supplied to our people, requiring all milkmen and small dealers to register their cows or herds with the health department, and an inspection made by our milk-inspector, who is a very competent veterinarian.

During the past few years this officer has discovered quite a number of tubercular cattle and caused them to be killed. He uses tuberculin in diagnosing his cases, but has not yet used the test on all the cows, but simply on those which have shown some symptoms of the disease.

The milk-inspector also requires the milkmen to have clean, well ventilated stables for their cattle, and also requires that the milk be properly cared for over night.

A couple of years ago our milkmen began to use a milk-preserved, which they put in the milk to keep it from spoiling, in order that they might discontinue the delivery of milk twice a day. The health board compelled the discontinuance of this practice, which was very injurious, especially to small children.

Personally, I am in favor of any means by which tuberculosis can be stamped out of the herds. I recall reading a very interesting case two or three years ago that occurred in Colonel Beecher's family. An infant son died of tubercular meningitis. The herd of three cows showed no evidence of tuberculosis, but on the physician's insisting that tuberculin be tried, two cows were found tubercular, as was proved by the post-mortem.

With kind regards, I am,

Yours truly,

W. D. HAMAKER.

A recent *Lancet* editorial presents the case as follows :

TUBERCULOSIS OF THE BONES, MUSCLES, AND EYES OF CATTLE.

"In the inspection of the carcasses of animals destined for the food of mankind, something more is necessary for the detection of tuberculosis than a cursory examination of the lungs and lymph glands, as the lesions are sometimes observed in the hard tissues and muscles, which are not usually cut into for investigation. In a German periodical, devoted to the hygiene of flesh and milk, the remark is made as to the comparative infrequency of tubercles in the flesh of cattle, and especially in the myocardium. In the latter situation only one instance had been observed until recently ; this was in a cow which had very extensive tuberculosis of the pleura, and in the wall of the right ventricle there was a tuberculous mass as large as a bean. Not long ago, at the Leipzig abattoir, a calf six weeks old and in good condition was slaughtered, and on dressing the carcass it was found to be affected with generalized tuberculosis—the lungs, the pleura, and lymphatic glands of the neck, chest, and abdomen, etc., being involved. On the right side of the heart, near the surface, and only separated from each other by a thin muscular partition, were two masses of tubercle, each as large as a hazelnut. One was imbedded in the wall at the left ventricle, near the auriculo-ventricular groove, and the other at the apex of the organ, on the middle of its anterior surface. Another veterinary abattoir inspector had some time before discovered a case in which there was

tuberculosis of the sternum, the elbow-joint, and the pectoral muscles. More recently he has met with another instance of muscular tuberculosis, which was apparently not primary, but consecutive to tuberculosis of the cartilage of the seventh rib. The latter was completely destroyed at certain points, the remaining portions containing yellow, rounded, cup-shaped nodules, which when removed left circular cavities that neither in color nor appearance could be distinguished from normal cartilage. Around the diseased cartilage there were seven small abscesses, one of which was open; the pus in these contained the tubercle bacillus. The cow was the subject of thoracic and abdominal tuberculosis. There are a number of cases of ocular tuberculosis in the ox recorded in veterinary literature, and among the latest are two described by Herr Winter, of Bromberg. The first case was that of a four-year-old Dutch cow, which was so stupid, or stupefied, as to be insensible to the voice and to blows. At its necropsy, generalized tuberculosis was noted, the pleura, lungs, peritoneum, lymphatic glands, liver, kidneys, ovaries, and udder, as well as the brain and its coverings, being diseased. The cornea of the right eye was opaque, bluish-gray in some places, and bluish-black in others. Near the internal angle there was a prominent mass formed of lenticular tubercles, and the sclerotic also showed pyriform and lenticular projections that appeared to come from the interior of the eye. At the junction of the cornea with the sclerotic there was another mass of the diameter of a 50 centime piece. The interior of the ocular globe was fully occupied by a caseous mass, bright yellow in color, semi-fluid, and containing calcareous particles. At the papilla of the optic nerve the retina was separated from its deeper layer by cheesy tubercles; the prominences seen on the outside of the sclerotic were found to be situated between that and the choroid coat, and were calcified in some places, and puriform in others. The crystalline lens could not be recognized, and the iris was confounded with the cornea. By the aid of the microscope, tubercle bacilli were found everywhere. The other case was that of an emaciated cow also affected with generalized tuberculosis. The right cornea was turbid and of a dark-blue tint; at the margin of the sclerotic there were several yellowish tubercles, each about the size of a lentil; the vitreous humor was muddy and opaque, but the retina and crystalline lens were normal. The posterior

surface of the iris was partially adherent to the lens by a thin white layer, and on its anterior surface there were nodules which could be seen through the cornea, with yellow miliary tubercles grouped in tufts, or in grape-like masses at its lower border where it joined the cornea. In all these neo-formations the tubercle bacilli abounded."

The statements of Drs. Hamaker and McLean, who are specialists in this line of work, are of great value, and the fact that with the better and carefully prepared milk in a city of 12,000 people there should be only two deaths from cholera infantum speaks louder than words.

Dr. Ernst, the bacteriologist of Harvard, who prepared an exhaustive report for the Massachusetts Society for Promoting Agriculture, in 1894, states:

"The desire of the committee was to determine whether or not the milk derived from tuberculous cows might contain the infectious material of the disease, and in this way become dangerous when used as an article of food, and this question was of necessity to be divided into two parts: first, whether this infection of the milk existed in cases in which there was actual tuberculous disease of the udder; and second, whether it might exist in cases in which the udder was apparently or actually healthy, the disease existing in other parts of the body. In regard to the first part of the question, plain common sense showed that the danger of infection was a real one, and besides there existed at the time sufficient experimental data to prove the fact, so that there was very little dispute that under such circumstances milk should not be used for food, certainly not in an uncooked condition." Evidence since then in the same direction has constantly accumulated, and now there are few to challenge the opinion that milk from cows with tuberculous udders should be condemned as food. Upon the second point, however, as to whether the milk from cows with tuberculosis, but not of the udder, might be dangerous, there was a great diversity of opinion, and almost no experimental evidence upon which to base what opinion there was. Work was prosecuted under the following headings: first, a careful and persistent microscopic examination of the milk from such cattle; second, inoculation experiments with such milk; third, experiments in feeding with the same milk. "After two years of continuous and methodical examinations of milk

from cattle at the experimental farm at Mattapan, of the Bacteriological Laboratory of Harvard, the following conclusions were reached—thirty-six cows having been examined and 121 examinations of milk and cream made: Each examination was made from the bottom and top fluid. In every case at least a dozen cover-glasses were used for each examination, and fifteen minutes' time was spent over each cover-glass. The staining employed was invariably 'Koch-Ehrlich, 24-hour method.' The bacilli of tuberculosis were found in one or more of the cover glasses upon nineteen different occasions. These nineteen positive results were obtained from twelve different animals, and were found in about equal proportion in milk and cream. The bacilli were actually seen in the milk of one-third of the animals. These conclusions were confirmed in twenty out of thirty-six animals by careful post-mortem examination. The inoculation experiments were made upon guinea-pigs and rabbits. In six weeks eighty-eight guinea-pigs were inoculated with milk and cream from fifteen different cows, twelve of which were tuberculous. Of ninety rabbits inoculated, six exhibited tuberculosis. Forty-eight rabbits were fed from thirty to ninety days with milk of tuberculous cows with healthy udders; two were infected with tuberculosis. After being similarly treated, twelve healthy pigs showed fifty per cent of tuberculosis; and of twenty-one calves, eight, or over thirty-three per cent, showed tuberculosis. In twenty-three cows of the twenty-five used for experimental purposes, not one had any tuberculosis of the udder. One had one giant cell with one bacillus. In all there were evidences of tuberculosis in other parts of the body. Of these cows, nineteen had calves, which were killed when six days old without any evidence of tuberculosis, showing absence of hereditary infection.

The summary of the reports states that in the practice of thirty-nine veterinarians, representing nineteen States, for one year, there were 549 cases of tuberculosis, with 242 suspicious cases—total, 791. Among 165 herds, containing about 3000 animals, 18 per cent were diseased and over 8 per cent suspicious—total, 26 per cent. The following conclusions are drawn:

1. "While the transmission of tuberculosis by milk is probably not the most important means by which the disease is propagated, it is something to be guarded against most carefully.

2. "The possibility of milk from tuberculous udders containing the infectious elements is undeniable."
3. "With the evidence here presented, it is equally undeniable that milk from diseased cows with no appreciable lesion of the udder may, and not infrequently does, contain the bacillus of the disease."

4. "Therefore, all such milk should be condemned as food."

These deductions are legitimate, and should (with the evidence of disease as represented by this article) lead us to examine with great care all milk products; and it should be the duty of the health officer to see that no milk is offered in this city that has not its proportion of butter-fat and solids, and that is not free from all agents that tend to prevent fermentation, and that the herds are free from tuberculosis and are properly fed and protected from the inclement weather, with abundance of sunlight and air. Further, a county veterinarian should be appointed by the City Board of Health, with proper salary, whose duty should be to visit each herd in the county twice a year or oftener, and test each cow with tuberculin when in his opinion it is necessary after the first initial test. This protection or milk-supervision should extend to neighboring counties, from whence our milk supply is largely secured, and at the expense of the producers.

With these protective measures carried out in the spirit of the law, and with proper influence exerted upon our lawmakers that legislation be made for the protection of farmers and dairymen by properly remunerating them for the loss of their fine cattle (which are peculiarly liable), and assisting all who will be pecuniary sufferers in stamping out this branch of this dread disease, in time consumption will be classed with the effete diseases, like smallpox and diphtheria.—*The Therapeutic Gazette*, No. 10, October 15, 1896.

THE USE OF COLD IN FEVERS.*

By H. A. HARE, M. D.

Professor of Therapeutics in Jefferson Medical College of Philadelphia.

Gentlemen.—I have brought this patient before you with the object of discussing the value and limitations of the application of cold for the reduction of abnormally high bodily temperatures.

First let us consider the disadvantages which accrue from the use of so called antipyretic drugs—remedies which, as you know, have until within a year or two been most popular with a large number of the profession in controlling febrile movement. Almost as early as their first introduction, original calorometrical experiments made by Professors Wood, Reichert and myself, and a number of other investigators, proved beyond all doubt that the majority of the coal-tar antipyretics, if not every one of them, control fever by decreasing the production of heat in the body and also by increasing the dissipation or elimination of heat. Under such circumstances bodily temperature must speedily fall. Theoretically, therefore, these remedies would seem at first glance to be the very best we could employ in the treatment of fever; but a little thought will make clear to you that, while they accomplish the reduction of the temperature, they must at the same time produce two results which are quite opposite to those which we seek. In the first place they exercise a powerful influence over the circulation, the respiration, and the organs of elimination as represented by the kidneys and liver. Again, they exercise a more or less destructive influence upon the blood and its closely related organ the spleen, interfering to such an extent with the oxygen-carrying properties of the red blood-corpuses that their use cannot but be associated with marked perversion of many of the normal functions of the body.

I do not wish you to think from what I have said, however, that I utterly condemn such remedies. On the other hand, I believe that our rule in the practice of medicine should be always to be moderate in our judgment as to the advantages and disadvantages of remedial measures, whether medicinal or

* Clinical lecture delivered at the Hospital of the Jefferson Medical College.

otherwise. The occasions on which the antipyretics will prove of value are, however, very limited, and in the vast majority of cases the physician should encourage and employ the use of cold to the exclusion of these drugs.

Let me point out some of the reasons why cold is both theoretically and practically the true means of reducing febrile temperature occurring in the course of infectious diseases.

As you well know, the body puts into effect several processes by which it endeavors to protect itself from infectious disease when first attacked. Those who believe in the theory of what is known as phagocytosis, or that certain leucocytes in the body attack, ingest and destroy germs of infectious diseases which gain entrance into the organism, also believe that antipyretic drugs in all probability exercise a deleterious influence upon the activity of these protecting phagocytes; in other words, these remedies to a certain extent render feeble one of the methods by which nature protects us from disease.

Secondly, fever is, no doubt, to a great extent a protective process; its development is an effort on the part of nature to protect us from the results of infection. There are a large number of experiments which point to the probability that high temperatures are not as favorable to the growth of many micro-organisms as the normal temperature, and there are many more to prove that any reduction of the bodily temperature below normal greatly increases the susceptibility of the individual to infection and its results. Again, it is a fact that the production of heat in our bodies is due to the oxidation of our tissues, and, therefore, fever means an increase in the oxidation processes. We also know that it is by means of oxidation that many vegetable poisons which are taken into our bodies are destroyed, and in all probability most of the animal poisons which are produced in the intestine or which are swallowed with the food are also destroyed in this way. In other words, the system by means of oxidation destroys the effete materials, just as a crematory does which is employed for incinerating refuse. If, therefore, the antipyretic drugs of the coal-tar class, of which I have spoken, diminish the manufacture of heat, they must also diminish the oxidation processes in the body—that is to say, the body is unable, when under their influence, to oxidize and discharge the poisons which are produced by the infecting micro-organisms.

Thus we learn that the use of these drugs prevents the body from protecting itself by destroying the poisons by phagocytosis and by fever with its associated processes. We also know that they prevent the liver and spleen from carrying out their ordinary functional activity; that they depress the nervous system, and particularly the vaso-motor nervous system, rendering the patient more susceptible to cold and congestion; and finally, we have experimental evidence to prove that the administration of antipyrin and similar compounds renders animals more susceptible to infections by disease than if they had taken no drug.

These are, then, some of my chief reasons for thinking that antipyretic drugs are inadvisable. What reasons can I give you for strongly advocating the application of cold in the reduction of fever? They are briefly these.

First, none of the organs of the body are strained in the effort at eliminating foreign materials, nor are their functions perverted by the presence in them of powerful remedies. On the contrary, the proper application of cold, associated with active rubbing of the skin to bring the blood to the surface, improves the circulation all over the body, increases nervous and circulatory activity, produces an elasticity of the blood-vessels, which is destroyed by the use of drugs, and increases the action of the kidneys, the organs which eliminate from the body most of the impurities.

Naturally, you may think me inconsistent in stating that fever is a protective process and yet urging you to use cold for its reduction; and I confess that these statements must seem paradoxical, but in reality they are not so. There is a great difference between stopping oxidation processes by the use of drugs, and abstracting heat from the body by the use of cold. When cold is used, heat-production probably goes on with even greater rapidity, at least after a brief time. By the bathing the bodily temperature is prevented from rising to the point at which the fever would be dangerous in itself, while at the same time the poisons produced by the disease are more rapidly burned up by the increased rapidity of oxidation. In other words, the application of cold simply increases the draught, and so burns up the refuse more rapidly than before.

These conclusions are not merely theoretical ones. Careful experiments by Liebermeister and other investigators in this

line prove that in many instances leucocytosis is markedly increased by the use of cold, and it is a well-known fact that by its use internal and external congestions are avoided, which if they came on in full force would seriously imperil the patient's life.

Before closing I wish to emphasize one fact, which, to my mind, is the most important of this lecture, namely, the manner in which cold should be used in the reduction of fever. It has always seemed to me that equally good and in all probability better results could be obtained if the use of cold were fitted to the case, just as the dose of digitalis, or any other drug is fitted to the case. No one would think at the present day of asserting that every case of heart disease requiring digitalis as a cardiac tonic should receive exactly twenty drops of the tincture, three times a day, but the common assertion would be that the dose of digitalis should vary with the necessities of the case. There is no such thing in medicine in connection with the use of drugs as recommending one definite dose for every case of any disease, and there is no such thing as a correct recommendation of one temperature or one method of the application of cold to every case of a given disease. To be successful practitioners, you must make your "punishment fit the crime," or, in other words, you must make your remedy and your dose fit your case just as the tailor makes a garment to fit each man.

In conclusion, let me say one word to you about the comparative value of antipyretic drugs and cold bathing in the treatment of non-infectious fevers, such as are represented by sun-stroke. Clinical experience has proved that under these circumstances the antipyretic drugs possess little value, and that we must always rely chiefly upon cold bathing for the relief of patients suffering from thermic fever.—The *Therapeutic Gazette*, No. 10. October 15, 1896.

THE PRODUCTION OF IMMUNITY TO HOG CHOLERA
BY MEANS OF THE BLOOD SERUM OF IMMUNE
ANIMALS.

ANTITOXIC SERUMS FOR HOG CHOLERA AND SWINE PLAGUE.

BY E. A. DE SCHWEINITZ, PH. D., M. D.

In the *Medical News* of September 24, 1892, I published the results of some experiments made upon guinea-pigs with the blood-serum of immune guinea-pigs, which proved that an injection of such serum would protect other guinea-pigs from hog cholera. Subsequently Dr. Theobald Smith and Dr. Moore conducted some similar experiments with rabbits, and, while these were not made entirely immune by the quantity of serum used, they showed great resistance to the disease. They did not carry this work upon rabbits further, though the indications were that immunity would have been produced had the doses of serum been larger.

As an accidental result of an experiment to show if the products of the *Bacillus coli communis* would serve to immunize against hog cholera, our experiments have been continued to see if the blood of the immunized hog would also induce immunity in other animals, as guinea-pigs, against hog cholera. The results proved that such immunity could be secured.

June 13, 1895, guinea-pigs were given blood serum from an immune hog (No. 151, killed June 11, 1895).

No. 425, weight 11 oz., received	3.0 c. c.
" 426, " 9 "	4.5 "
" 423, " 11 "	1.5 "
" 422, " 9 "	0.5 "
" 424, " 8 "	2.0 "

On June 15 pig No. 425 was found dead from blood-poisoning.

On June 20 pig No. 425 was found dead from blood-poisoning and pleurisy. On June 19, 1895, two pigs were inoculated with the nuclein-like substance obtained from the same serum that was used to inject the other guinea-pigs. Each pig received 0.06 grammie of the supposed active principle of the blood.

No. 416, weight	3½ oz.
" 417, "	14 "

June 28, 1895, two checks, Nos. 442 and 443, and treated pigs Nos. 416, 417, 422, 423, and 426 were inoculated with a one-tenth cubic centimetre hog-cholera culture on peptonized beef broth one day old.

July 5, No. 416 was found dead,
" 8, " 417 " " "
" 5, " 442 " " "
" 3, " 443 " " "

all upon necropsy showing characteristic hog-cholera lesions.

The other inoculated animals appeared to recover and were well. On December 21, six months after exposure to the disease, guinea-pig No. 426 was found dead. Necropsy, however, showed that the animal had died from pneumonia.

Again, December 26, 1895, serum from hog No. 150 killed, and serum collected December 24, was used to inject two pigs.

No. 73, weight 16 oz., received	3.0 c. c. serum
" 51, " 17 "	4.5 " "

On January 25 these pigs, checks, and Nos. 379, 377, and 376, the latter inoculated last in May, received one-tenth cubic centimetre hog-cholera culture.

On January 31 No. 73 and 51 and checks were found dead from hog cholera, while the others, although apparently a little ill for a few days, had recovered.

These experiments show that an immunizing substance is produced in the blood of the protected hog; that while the animal itself may remain immune to disease, as is shown by the guinea-pigs, its blood will have lost the power of conferring immunity to other animals. This confirms the conclusion in other diseases in the use of blood serum, that the immunizing principle of the blood serum can be kept constant only by having the animals reinoculated from time to time. Apparently the antitoxic substance can be the product of cell activity only. So long as the animal is kept inoculated with the toxin or the germ, not only does the immunity of that particular animal continue, but the antitoxic substance is found in the blood. After some intermission the antitoxic substance is contained in the blood, only in small amount, but the immunity of the individual still continues. In the use of antitoxic serum, therefore, its efficacy lies in the fact probably that, counteracting the poison first produced by the germs, it gives the cells the opportunity to recover their temporarily weakened activity and

supply more antitoxic substances. The experiments prove that the serum of immune hogs can produce immunity in guinea-pigs, and that a distinctive antitoxic substance must be formed.

This conclusion as to a distinctive antitoxic substance was confirmed in the following experiments, in which antitoxic serums were used in an attempt to cure both hog cholera and swine plague in guinea-pigs.

The antitoxic serum for the hog cholera was obtained from a cow which had been treated by Dr. Schroeder, for some time, at the experiment station of the bureau.

March 9:

Guinea pigs.	
No. 223, weight	12 oz.
" 222, "	17 "
" 221, "	11 "
" 220, "	12 "
" 219, "	17 "

Each received a cubic centimetre and a half of serum from cow No. 24.

March 16: No. 221 died from pneumonia.

March 18:

No. 223, weight	14 oz
" 222, "	19 "
" 220, "	11 "
" 219, "	18 "

Each received three cubic centimetres of serum.

March 23:

No. 219, weight	17 oz.
" 222, "	17 "
" 246, "	9½ "
" 242, "	10½ "
" 243, "	10¾ "

Nos. 219 and 222 each received a cubic centimetre and a half of serum and the remainder three cubic centimetres of serum each.

March 28:

No. 242, weight 12 oz., received	3.0 c. c.
" 243, " 12 " "	3.0 "
" 246, " 11 " "	3.0 "
" 223, " 13 " "	4.0 "
" 219, " 18 " "	4.5 "
" 222, " 18 " "	6.0 "

of the same serum.

On March 20, No. 220 had been found dead from pneumonia.

On April 9, the following pigs were inoculated with a one-tenth cubic centimetre of hog-cholera culture each:

No. 230, weight	23 oz.
" 222, "	10 "
" 223, "	12 "
" 242, "	13 "
" 243, "	13 "
" 246, "	12 "
" 260, "	12 " check.
" 261, "	12 "
" 262, "	15 "
" 263, "	20 "
" 264, "	14 "
" 241, "	15 " check.

April 11:

No. 261 received	3.0 c. c. serum.
" 262 " 13 " "	3.0 " "
" 263 " 17 " "	5.0 " "
" 264 " "	4.5 " "

April 14:

No. 261, weight 11 oz., received	3.0 c. c. serum.
" 262, " 13 " "	3.0 " "
" 263, " 17 " "	4.5 " "

April 17: No 260 check was found dead from hog cholera.

April 19: No. 222 was found dead from hog cholera.

April 20: No. 264 was found dead from hog cholera, necropsy showing characteristic post-mortem appearance except a slight complication with pneumonia.

April 25: No. 241 check was found dead from hog cholera. Nos. 219 and 223 were also found dead, showing evidence of pneumonia in addition to hog cholera, and No. 261, found dead on April 25, 1896, showed upper lobe of right lung consolidated from pneumonia, in addition to coagulation necrosis of the liver. There had been quite an outbreak of pneumonia among the guinea-pigs, which accounted for these lesions. Of the entire number of pigs, therefore, of those that had been previously inoculated with serum, three animals (Nos. 243, 242, 246) that had been vaccinated with six cubic centimetres each of serum and two (Nos. 262 and 263) that had received six and eight cubic centimetres of serum each after inoculation, recovered from the disease. Had the pigs not been exposed to infection with pneumonia it is likely all would have recovered.

This experiment, repeated later, showed that while the blood contained an antitoxic principle, the amount was not sufficient to cure the disease by the injection of sufficiently small doses, and we are now endeavoring to increase the amount of antitoxin in the blood of the cow.

As my experiment in 1891 with the products of the swine-plague germ had shown that these could be used for the production of immunity, and subsequently Dr. Smith and Dr. Moore had satisfactorily produced immunity by the inoculation with serum from immune animals, it was very reasonable to suppose, when the nature of this disease is remembered, that an antitoxic serum for swine plague can be easily obtained. A cow was again used for the source of the serum after she had been repeatedly inoculated. The preliminary tests were made upon rabbits. A twentieth cubic centimetre of a peptonized beef-broth culture of swine-plague germ was sufficient to kill a rabbit in fifteen to eighteen hours. Several sets of experiments showed that while the checks died within the required time, other rabbits, inoculated at the same time and with the same quantity of culture, could be kept alive from six to ten days longer than the checks by the injection of nine cubic centimetres of serum per pound weight. As an antitoxic substance was present in the serum, therefore, I tried its effects on guinea-pigs. One-tenth cubic centimetre of the culture used was sufficient to kill a guinea-pig in forty-eight hours. The experiment was as follows:

July 10:

Guinea-pigs.								
No. 348, wt. 12 oz., check, received $\frac{1}{10}$ c. c. swine-plague culture only.								
" 349,	" 8 "	"	"	"	"	"	and 3 c. c. serum.	"
" 350,	" 11 "	"	"	"	"	"	5 "	"
" 351,	" 9 "	"	"	"	"	"	6 "	"
" 352,	" 8 "	"	"	"	"	"	6 "	"
" 353,	" 8 "	"	"	"	"	"	12 "	"

On July 20 the check was found dead. On July 29 the pig that had received the serum alone was found dead, necropsy showing peritonitis, pleurisy and pericarditis, which were apparently produced by the large dose of serum. The pigs receiving the antitoxic serum recovered, according to the doses given, six cubic centimetres per pound weight being required to check the disease.

I next tried, with the assistance of Dr. Dorset, to isolate the antitoxic principle from the serum, according to a method given by Bieger and Boer for the isolation of diphtheria anti-toxin (*Zeit. für Hyg.*, Bd. xxi, Pt. 2) by the use of zinc sulphate, repeated solution in NaOH, and precipitation with CO₂. In this way from ninety cubic centimetres of serum we obtained .1500 grammes of a white, practically ash-free powder.

The antitoxic properties of this substance are now being tested.

In one set of experiments guinea-pigs inoculated with hog cholera were given swine-plague serum, and other pigs inoculated with swine plague were given hog-cholera serum. These serums were without effect, except in case of their corresponding disease, showing again their independent character—the swine-plague serum protected from or cured swine plague only, the hog-cholera serum protected from or cured hog cholera only. These preliminary experiments serve to show us that specific antitoxic serums for hog cholera and swine plague may be obtained. A more detailed account of these and other results will be published as a department bulletin.

Department of Agriculture, Biochemic Laboratory, Bureau of Animal Industry,
Washington, D. C., July 30, 1896.

TRANSLATIONS.

NITRIC ACID CAUTERIZATION IN THE TREATMENT OF UMBILICAL HERNIA IN COLTS.¹

BY T. PEUCH.

The employment of nitric acid in the treatment of umbilical hernia in colts is credited to Dayot, a French veterinarian. The first observation by this practitioner was made in a very accidental manner in 1844, and was reported by H. Bouley to the Central Society of Veterinary Medicine of Paris in 1848. This was the beginning of a series of experiments upon colts by Dayot, which he had purchased for this purpose, and subsequently upon animals belonging to his clients. This experimentation sufficiently demonstrated to him the harmlessness of this new treatment as well as the effectiveness of its therapeutic action. In a memoir he recounts forty-two cases in which favorable results were obtained from the above treatment of umbilical hernia in colts.

Encouraged by these results A. Sanson, in 1849, published a similar observation of exomphalus in a mule five months old, which had been previously unsuccessfully treated with the combined use of the clamp and suture, and subsequently cured by nitric acid cauterization. Then Legoff announced having treated six herniae with the method of Dayot, of which one was so large that the four fingers and thumb could be introduced into the opening.

Up to this time no accident had been mentioned, until an anonymous correspondent in the *Recueil de Médecine Vétérinaire* reported a case of eventration following seven or eight days after the nitric cauterization. Roche subsequently published two cases of eventration following nitric acid cauterization, in a young donkey and a dog. Charrant relates a case in a filly eight months old, operated on five times by an

¹Jour. de Méd. Vét. et de Zoötechnie.

empiric, and in which the hernia had attained the volume of two fists. The operation was successful. To these facts must be added others which bear evidence of the efficacy of Dayot's procedure, especially those of Sanson and Perosino. In a series of experimental researches, including those of the other observers, H. Bouley formulated the rules which should guide one in the application of a caustic as powerful as nitric acid upon a tumor as vulnerable as the intestine is. Among these rules there is one upon which Bouley has especially insisted: Always to consider the first cauterization sufficient, and only to have recourse to a second one twelve to fifteen days after the first. This fundamental rule follows from practical experience, and the skin of the umbilical region submitted to nitric cauterization preserves for some days its suppleness, sensibility and all the characters of vitality. But these appearances are sometimes deceiving, and if one is not apprised of this condition after the first application one might be led to believe that the action of the caustic is insufficient, and practice a second or even a third in the course of the first eight or ten days of the treatment. This is always a certain cause of eventration, as is verified by the accidents which have complicated nitric cauterization. Thus, in this journal, is reported a case of umbilical hernia in which the nitric acid application has been repeated daily during four successive days. In this case there was a penetrating abdominal wound when the eschar separated, but the eventration of the intestines was prevented by the application of bandages and wads of oakum over the orifice.

Besides this first rule, which it is very essential to observe, H. Bouley and Reynal have endeavored to ascertain the degree of concentration in which the nitric acid could be employed. What quantity should be used, approximately at least, according to the volume of the tumor? What should be the duration of its application? As to the first question, it is estimated that the commercial nitric acid is sufficiently caustic to accomplish the result for which this treatment is applied to the surface of a hernial tumor. The quantity that is employed varies from ten to fifteen grams, two and one-half to four drams; but it is very evident that the dose must be modified according to the volume of the hernial sac and the looseness of the subcutaneous connective tissue. Likewise the duration of the application of

the acid should not be fixed in a mathematical manner. It has been determined at from two to three minutes. In fact, the application is largely a matter of tact which cannot be precisely calculated, and the indication to be fulfilled consists in allowing the acid to be well imbibed by the skin over the entire hernial sac. The acid is painted over the tumor from the circumference to the centre, with a pinch of oakum passed over the skin three or four times. A second application should never be made before the eschar from the first has separated. The following cases will indicate how successfully we have employed the nitric acid cauterization in umbilical hernia:

Observation I.—On October 3 we saw a filly six months old having an umbilical hernia of the volume of an egg. The skin covering it was fine, supple, and by moderate pressure the hernia could be reduced; two fingers could easily be inserted into the umbilical opening.

October 6, nitric acid was painted over the entire surface of the tumor with a small pinch of oakum. The oakum dipped into the acid was passed four times over the skin; the ordinary precautions were used that the animal should not injure the parts. The next day the region was edematous, the skin supple and, excepting the yellow coloration produced by the acid, it did not appear to be altered.

Toward the fourth day after the cauterization the skin became less movable over the subjacent tissues and at the same time was infiltrated and thickened. The edema was very pronounced and completely masked the hernia. The following days the edema was gradually absorbed; at the same time the reactive inflammation was established and the elimination of the slough was complete in thirty-two days after the commencement of the treatment. The hernia completely disappeared.

Observation II.—Gelding, three years old, umbilical hernia as large as a walnut. Nitric cauterization in which the pinch of oakum saturated with the acid is passed four times over the hernial tumor. The next day there was a slight edema of the umbilical region, but the skin was neither more thickened nor less supple than in the non-cauterized parts. The third day the integument was a little thickened and infiltrated; the following days the skin became hardened and parchment-like. The elimination of the eschar was effected slowly and was not

completed when the animal left the hospital, twenty-five days after the application of the acid.

A month afterward the horse was brought to us suffering with glanders; the hernia had completely disappeared and there were no apparent traces of the cauterization.

Observation III.—Colt, fifteen months old, very energetic having an umbilical hernia as large as an egg. Moderate pressure easily reduced the hernia and two fingers could be introduced into the umbilical opening.

Nitric cauterization was practiced as in the preceding case. This operation was done on May 13, and on the twenty-sixth of the same month, or thirteen days after the application of the treatment, the animal was returned to us; the eschar had almost separated and the hernia had disappeared.

Observation IV.—Filly, ten months old, affected with umbilical hernia as large as a turkey egg.

The hernia could be easily reduced and three fingers inserted into the umbilical orifice. It had been unsuccessfully treated with pressure bandages and pitch emplastrums. In spite of the volume of the hernia, the nitric acid treatment was decided upon. The first application was made in accordance with the usual rules. The result was an edema but little pronounced and a superficial eschar which was eliminated about the twentieth day. The hernia was very much diminished.

A second cauterization was then practiced. This time the edema was more pronounced, the eschar more thick and its separation was accomplished only in about twenty-eight days after the application of the nitric acid. The hernia remained more or less apparent, but much less in volume.

The third cauterization was made upon the wound resulting from the separation of the eschar; this resulted in an edema and the formation of a new eschar which was eliminated with much slowness, requiring about thirty-five days to effect a complete separation. At this time the skin of the umbilicus was thickened and the hernia had disappeared.

By recalling to our confrères the use of nitric acid cauterization in the treatment of exomphalus in foals, colts or fillies, we have endeavored to show that by applying the same in a rational manner, we can surely avoid eventration, even when it is a question of quite a voluminous tumor, as is indicated in our fourth observation.

THE IMPORTANCE OF TUBERCULOSIS OF CATTLE AND SWINE, AND ITS SUPPRESSION.

[Issued by authority of the Ministry of Agriculture and Forestry of the Kingdom of Prussia.]

I. ECONOMIC IMPORTANCE OF TUBERCULOSIS.

Tuberculosis of cattle and swine is very prevalent on many farms and causes much loss in the following ways:

1. By causing the disease in healthy animals.
2. By diminishing the value of the meat, since the flesh of tuberculous animals that are slaughtered for food is in part or altogether worthless as human food.
3. By the waste of food, because tuberculous cattle eat a great deal and return no value for it.
4. By diminishing the productiveness of the herd.
5. By restricting the milk yield and by virtue of the constant danger that the disease may be conveyed to persons, calves and swine through the consumption of raw milk.

These dangers become greater when the disease has prevailed in the herd for a long time.

II. THE NATURE OF TUBERCULOSIS.

Tuberculosis is a dangerous disease that is caused by the *tubercle bacillus*. Tubercle bacilli are breathed and coughed out of the air passages of tuberculous cattle and are breathed in by neighboring healthy animals and lodge in the respiratory tract. The milk, also, of tuberculous cattle may contain tubercle bacilli, and when such milk is consumed in the raw state as whole milk, skim-milk or buttermilk, or when the gummy residue found in milk separators is fed to calves or swine the disease may be thus transmitted. It is indeed probable that tuberculosis of swine is usually caused by the consumption of raw milk from tuberculous animals. Persons may contract tuberculosis by consuming the raw milk of tuberculous animals or by consuming its products. On the other hand, it may be that cattle can contract tuberculosis from man through the tuberculous material that is coughed up by consumptives.

Tuberculosis is not hereditary, but the predisposition to tuberculosis, which means low resisting powers to the activity of the tubercle bacilli, may be inherited. A predisposition of this kind may be acquired as the result of keeping cattle, under unfavorable conditions, in bad stables for a long time, or by feeding poor food and other similar influences.

III. RECOGNITION OF TUBERCULOSIS.

In tuberculous cattle one may observe the following symptoms: cough, emaciation, with good appetite; slow movements, rough coat, tight skin, tendency to tympanites. In milch cows the following symptoms may also appear: Diminution in milk production, gradually increasing swellings on various parts of the udder. Sometimes cattle may be afflicted with extensive tuberculosis without presenting marked symptoms of disease. In tuberculous swine it is not customary to find symptoms of disease, and, in particular, disturbances of nutrition are rarely observed. It is only in exceptional cases, and when a very careful examination is made, that it is possible to find hard, painless swellings in the lymphatic glands in the vicinity of the larynx and the joints.

In those cases in which the disease is not characterized by prominent symptoms *tuberculin* has a very high value. Tuberculin is a fluid. When tuberculin is injected under the skin there follows in nearly all tuberculous animals a reaction—that is, an elevation of the temperature of the body; while if the animal is not tuberculous, with but very few exceptions, there is no elevation of body temperature. Where the disease is very extensive, sometimes the reaction does not occur, but this is of minor importance, because such animals present other symptoms of tuberculosis that enable the examiner to recognize its existence.

Tuberculous animals can be recognized by the symptoms mentioned above or by the use of tuberculin. *This makes it possible to separate the healthy animals from those that are tuberculous, and thus successfully combat the disease.*

IV. THE EXTERMINATION OF TUBERCULOSIS.

(A) *Tuberculosis among Cattle.*—The procedure begins by subjecting all of the cattle to a tuberculin test made in accordance with the appended rules and conducted by a qualified

veterinarian. Thereafter the following measures are to be enforced:

1. Separation of all cattle that react to tuberculin (group 1), also all cattle that show external evidence of tuberculosis, whether they have reacted to tuberculin or not (group 2), from those that do not react to tuberculin and show no sign of tuberculosis (group 3).

This separation is best made by placing the cattle that have not reacted (group 3) in another stable. If this is not possible it is advisable to separate the stable in two parts by making a partition of boards or of masonry. This partition should be a thick one and must have no doors or openings of any kind. There is nothing against windows in this wall, provided they are so arranged that they cannot be opened.

The stable, or that part of the stable in which group 3 are placed, must previously be thoroughly cleansed and disinfected, in order to free it from the germs of tuberculosis. In doing this it is sufficient for all parts, including the floor, after they have been thoroughly cleansed, to be coated with a white-wash made of lime and water in the proportion of five parts to 100. It is advisable to treat the mangers with a solution of lye of the same strength.

The cattle of the third group are to be fed, watered and pastured by themselves. If oxen, they must not be worked with members of group 1 or 2, and separate utensils should be provided for them. This provision is to continue in operation until all of the cattle of the first and second group have been disposed of or removed from the herd. Further, no newly-purchased cattle shall be added to group 3 unless they are free from all evidence of tuberculosis and have failed to react after the injection of tuberculin.

4. It is advisable to have the cattle of group 3 cared for by a special attendant, and the use of consumptives for this purpose should be avoided.

5. The cattle of group 3 are to be retested with tuberculin at intervals of six months. Cattle that react to a second injection of tuberculin, and this occurs very rarely, must be immediately separated from their associates that have not reacted to tuberculin and treated as the cattle of group 1 are treated.

6. It is advisable to send the cattle of group 2 to the slaughterhouse as soon as possible.

RULES GOVERNING THE DISPOSITION OF THE MEAT OF
TUBERCULOUS ANIMALS.

According to the Ministerial order of the twenty-sixth of March, 1892, it is provided that the meat of tuberculous cattle shall be considered unwholesome when the flesh contains tubercles, or when the flesh is without tubercles and the animal is emaciated.

On the other hand, the flesh of a tuberculous animal is regarded as edible when the animal is well nourished, and

- (a) The disease is confined entirely to one organ not the muscles, or
- (b) When two or more organs are affected, and these are confined to the same body cavity and are directly united to each other, or are connected by lymph vessels or by blood vessels that do not belong to the general circulation, but to the circulation of the pulmonary or portal system.

7. Tuberculous organs, or the unwholesome meat of tuberculous animals that have been slaughtered, must be disposed of in such a way that the contained tubercle bacilli will be destroyed. This can be accomplished by burning or burying. If the parts to be destroyed are buried they should previously be covered with lime or carbolic acid, or some other bad smelling substance. The tuberculous organs or the unwholesome flesh of tuberculous cattle must not be fed to swine nor be thrown into the manure pile.

8. Cattle of group 1 can be used for the usual purposes, but it is advisable to dispose of them as rapidly as this can be done without detriment to the business of the farm, or as rapidly as they present other symptoms of tuberculosis.

9. The calves that are born from the cows in the first group must be removed from their dams on the second day after they are born, and should be placed with cattle of the third group.

On the first day after their birth, these calves can be allowed to nurse or can be fed with fresh milk, because the colostrum is necessary for the purpose of emptying their bowels, and the ingestion of the few tubercle bacilli that may be taken in at one time, under these conditions, can probably be borne without detriment.

From the second day on, the calves must receive only boiled or sterilized milk, and this applies not only to the whole milk, but also to skim milk that is fed at a later period. The pasteurization of the milk is not sufficient to destroy the tubercle bacilli that may be present.

The calves from cows in the first group should be tested with tuberculin when they are a few weeks old. If they react to the injection of tuberculin they should be at once removed from the stable in which the cows of the third group are kept and sent to the slaughterhouse as soon as possible. *It is most urgently recommended to give all calves, after they are weaned, and including those from the cows of the third group, no milk that has not been boiled.*

10. For breeding, no bulls should be used unless they have been tested with tuberculin and have not reacted. It is advisable to use special bulls for the first and second groups.

(B) *Tuberculosis among Swine.*—For the suppression of tuberculosis among swine the following measures are sufficient:

1. When whole milk, skim milk or buttermilk is fed to swine it should previously be boiled or sterilized.
2. Swine must not be allowed to eat the sticky material that collects in separators, nor the organs or unwholesome meat of tuberculous animals.
3. Consumptives should not be allowed to care for swine.

V.—CONCLUDING REMARKS.

The eradication of tuberculosis in herds in which there are but few tuberculous animals is much easier than in herds where a large proportion or nearly all of the cattle are tuberculous, but even in the latter cases the trouble and time required for the suppression of this disease is amply rewarded by the possession of cattle that are free from tuberculosis. Therefore, it is recommended that when cattle for breeding are purchased, less attention should be paid to pedigree and more to their freedom from tuberculosis. This also applies to the purchase of milch cows. In addition, it has been learned by the use of the tuberculin test that there are herds in Germany that are free, or almost free, from tuberculosis, so that breeding material of the right kind can be obtained.

INSTRUCTIONS FOR MAKING TUBERCULIN TESTS ON CATTLE
AND SWINE.

1. Tuberculin can be purchased from the apothecary of the Veterinary School in Berlin or Hanover, in diluted form, at the cost of production. This diluted tuberculin cannot be kept very long. It should be kept in a cool place and used within eight days after its arrival.

2. The undiluted tuberculin retains its activity for several months when it is kept in a well-stoppered bottle and in a cool, dark place. Before it is used it must be diluted with nine times its volume of a $\frac{1}{2}$ per cent aqueous solution of carbolic acid.

3. For the purpose of injecting tuberculin one can use the ordinary hypodermatic syringe, having a capacity of 5 c. c., and that has been thoroughly cleansed and disinfected. A strong needle should be used. After every injection the syringe should be carefully sterilized. Absolute alcohol may be used for this purpose.

4. The diluted tuberculin should be injected subcutaneously on the side of the neck or in the region of the shoulder.

5. The dose of undiluted tuberculin is for cows and bulls, 0.5 c. c.; young cattle, 0.25 c. c.; calves and swine, 0.1 c. c. The dose of the diluted tuberculin is ten times the above.

6. The late evening hours are the best for the injection of the tuberculin.

7. At least two temperature measurements should be made before the tuberculin is injected: the first of these six hours before the injection, and the second immediately before the injection.

8. The tuberculin reaction (Höchster preparation) usually appears within from twelve to fifteen hours after the injection. After the injection at least four temperature measurements should be made, and best at the ninth, twelfth, fifteenth and eighteenth hours after injection. If, for example, the injection is made at 9 o'clock in the evening, the measurements on the next day would be made at 6 o'clock in the morning, 9 o'clock in the morning and 12 noon and 3 p. m.

9. When the highest temperature after injection is compared with the highest before injection, we may observe the following in reference to the difference:

- (a) The temperature of the injected animal rises 1.5° C. above the temperature that was established before the injection. In this case the existence of tuberculosis is to be assumed.
(b) The difference is less than 1.5° C. In this case it is to be assumed that the animal is free from tuberculosis.

10. As a rule, one injection of tuberculin is sufficient. In especially important cases, as for example in bulls that are competing for prizes, or that are to be purchased by the State, it is advisable to make two injections, the second injection should be made four weeks after the first one.

11. For the purpose of taking the temperature, several tested thermometers must be at hand. The one used for taking the temperature before the injection should also be used for taking it after the injection if this is possible.

12. Animals in a feverish condition and animals in a very advanced stage of tuberculosis are not appropriate subjects for the tuberculin test.

TUMORS OF THE ENCEPHALON AND CRANIAL CAVITY.¹

BY A. LABAT.

CYSTS.

Serous cysts are quite frequent. Their contents consists of a more or less dark-yellowish, viscid, albuminous liquid, sometimes flocculent, always more or less rich in cholesterol, sometimes dissolved, sometimes in plates or in flakes held in suspension.

The enveloping membrane is thin or thick, and of a fibrous structure. The volume varies from that of a hazel nut to that of a hen's egg, and even larger.

Most frequently only one cyst is found. Zundel discovered two in a horse. Leach has seen a similar instance.

Serous cysts have been found in the most diverse conditions and situations: between the meninges and the skull, adherent

¹ Rev. Vet.

to the dura mater (Debeaux); between the cerebral hemispheres, and without any adhesion (Zündel) or pediculated upon the falx cerebri (Leloir); in one of the ventricles, fixed by a thin pedicle upon the posterior part of this cavity (Nocard and Mol-Creau) or attached to the choroid plexus (Leach).

Small vesicular cysts filled with serum, varying in size from a pin-head to a pea, are frequently seen upon the cerebral choroid plexus in the interior of the lateral ventricles.

Dermoid cysts are much more rare than the serous variety. Colas and Leblanc have observed a hair cyst in a horse. The growth developed at the base of the skull between the bones and the dura mater. It had the size of a hen's egg, and was strongly adherent to the sphenoid bones which were thin and deformed. The walls were thick and ossified, excepting at the centre, where, by an incision, it was opened and a thick fatty mass surrounding hairs of diverse colors was discovered; at some points the hairs were implanted in the wall of the cyst.

In the skull of a hydrocephalic calf, Morot and Roland discovered a dermoid cyst attached to the meninges by a fibrous pedicle. The essential portion of the cyst consisted of an osseous plate, half as large as a man's hand, and provided at one of its borders with four teeth—two normal molars, a double molar and one canine tooth.

Goubaux described a dental cyst which protruded from the cranium of a horse. The growth was situated in the right half of the sphenoid. The tooth had pressed against the skull wall, and penetrated the bone after the manner of a nail. The intra-cranial tumor was covered at its base by the bone which it had perforated; it was irregularly cylindrical, 36 mm. in diameter and 51 mm. in thickness. Its anfractuous summit was only one centimeter distant from the superior wall of the skull.

OSSEOUS TUMORS.

Intra-cranial osseous tumors or *enostoses* may result from all causes capable of producing an hypertrophy of bone, and especially from blows, contusions, fractures, etc. In such cases, the cranial bones are increased in thickness, and their external or internal or both surfaces irregularly mammillated. Leblanc has observed a generalized thickness of the bones of the skull of a lion. The enostoses of traumatic origin are, perhaps, not very rare. Enostoses are especially found upon

the arch of the cranium, and differ as to extent, prominence, hardness and compactness of the bony tissue. A remarkable case is reported by Siedamgrotzky: Asymmetrical and irregular osteophytes upon the internal face of the cranium; they reduced the capacity of the cranium, compressing and deforming the encephalon.

In old subjects, osseous plates of variable thickness and extent are found in the dura mater, the falx cerebri and the tentoria. The dura mater has the aptitude of forming bony plates from the fact of its resulting from a splitting in two of the fibrous lamina which constitutes the primordial cranium. These ossifications sometimes assume a large volume in early life and even in fetal existence. Bolot and Liénaux witnessed an osteoma of this kind in a calf about a month old. It resembled a horn, and was not less than eight centimeters in length. This tumor, emanating, perhaps, from the dura mater, perhaps (before the differentiation of this membrane) from an abnormal nucleus of ossification in the primordial cranium, may have commenced to grow before the formation of the cranial bones; subsequently when the latter were developed it became compressed between the two frontals. It remained mobile in a fistular space, persisting between these two bones.

The osteoma was covered externally by the skin, and showed itself by a slight elevation; the internal extremity was enveloped by a fibrous lamina, continuous with the falx cerebri. Pressure upon the tumor caused the animal to fall to the ground, due to pressure by the growth upon the encephalon; the compression was of short duration, and the calf rapidly returned to the usual state.

Certain exostoses of unknown origin are remarkable for their excessive development. They press upon and gradually occupy the place of the brain substance, so that they may be mistaken for the latter—ossified or petrified. It is these which are described as *ossification* of or *petrifaction* of the brain by Bartholin, Scarabici, Duverney, Baron, Lordot, Leroy and Patellani, Simson, Damoiseau, *et al.*

They form cerebriform masses in aspect and volume, in which condition observers have claimed to recognize, at least in the more complete ones: (1) The cerebral hemispheres clearly separated; (2) A cerebellum with distinct lobes; (3) A surface showing cerebral convolutions separated by sinuous

fissures; (4) On section, obtained without difficulty on account of the hardness of the neoplasm, the cavities and details of a normal brain structure; (5) Finally, complete resemblance with the encephalon, in that the morbid growth was enveloped entirely or in part by membranes analogous to the meninges. These masses were not always perfect. In some cases the "cerebellum" was not complete, but the resemblance to the cerebrum was recognizable; in others, the general form of the encephalon could be recognized, but within the mass were found cavities occupied by a substance "having the characters of nerve substance," or else one could recognize the existence "of envelopes" similar to the meninges, and then the section recalled "by its tints and its peculiarities" a section of the cerebrum. These proofs (?) should suffice, and the conclusion that the cerebrum had undergone ossification became evident, a conclusion so much more extraordinary as the injury to the cerebrum had been compatible, it may be said, with life and the accomplishment of its functions.

Nevertheless, it follows also from the circumstances that the precited authors have not always themselves made the necropsies, nor made upon the cadaver the necessary examination to prove their assertions. Many of the tumors have been collected by laymen, removed from the bones of the head more or less carelessly, and have only indirectly been brought to their notice; hence, some of the conclusions advanced must be held in reserve. Yet, certain authors have made a precise analysis of these singular facts; they have compared them with those obtained from personal observation (Vallisnieri, Johne): they examined the specimens previously described (Gall, Duméril); they have finally been able to reply to the question as Goubaux has done with the observation of Damoiseau. What has resulted from their work? Proofs that have invalidated the ideas advanced. Without taking into account the weight and the volume of the neoplasms which generally exceed the weight and volume of the encephalon and the capacity of the cranium, it remains beyond a doubt: First, That there is always a very great disproportion between the component parts, considering the cerebrum, cerebellum, etc.; Second, That the irregularities on the surface are disposed without order, are not symmetrical on both sides and do not resemble the cerebral convolutions; Third, That, at least in the specimen

examined by Duméril, the eminences and depressions representing the cerebral convolutions are inverse to the true cerebral convolutions, and represent the imprints of these latter, "the brain substance being compressed, having in some manner served to mould the surface of the osseous growth;" Fourth, That their structure is homogenous; that the diverse appearances and the lines seen on section indicate the progress of the formation and not a differentiation in the component elements; Fifth, That whenever the brain was looked for it was small, atrophied and found to one side of the neoplasm or partly surrounded by the latter. For all these reasons one must reject the existence of the ossification or petrifaction of the brain.

These hard, cerebriform bodies must be regarded as osseous tumors developed within the cranium but not within the brain. The most frequent point of attachment of these tumors is the petrous portion of the temporal bone, and it is at this point, as Sutton remarked, that the centres of ossification are most numerous. The centres may be arrested in their development in early fetal life, only to resume their activity in adult life and then to form osseous growths within the cranium as well as on the exterior.

The cerebriform osseous tumors are only observed in bovines, and always produce certain evident symptoms, such as lowering of the head, abnormal muscular movements, coma, emaciation, etc. The weight of the tumors is considerable, from 218 and 437 grams (Vallisnieri) to 545 grams, with a volume of from 220 c. c. (Damoiseau) to about 3000 c. c. (Leroy and Patellani). It seems remarkable that tumors of such volume can be lodged within the cranial cavity without producing any deformity. Nevertheless, in general, attention has not been attracted by any deformity of the cranial region except in the case of Thion, in a cow, in which the space between the bases of the two horns was more prominent than normal. These neoplasms more or less resemble the cerebrum; sometimes they are bilobed; the irregularities on certain parts of the surface more or less recall the cerebral convolutions and fissures, but there is no regularity as to their disposition, and they affect diverse situations and proportions. The tumor is often covered by an enveloping membrane. Their hardness is extreme; they are cut with difficulty even with the saw and are very strongly adherent to the

cranium. Their structure is distinctly osseous, as has been demonstrated, notably by Manal and Goubaux; the tissue is hard, dense and comparable to ivory, due to the gradual diminution in calibre of the bony canaliculi, with a concurrent calcareous infiltration. Their tissue is often homogeneous, grayish or bluish, solid or provided with cavities. Sometimes a section shows a variety of colors, forming gray, yellow and blue zones, indicative of successive deposits in the development of the neoplasm. The mass is sometimes constituted of eburnated osseous nuclei, separated by tissue less compact or even soft, in which the ossification is not complete or has not yet commenced. These tumors are generally solid. In the interior of some that are old one or more cavities filled with a cheesy material are found.

The tumor observed by Thion in the cranium of a cow belonged to this group. The centre of the tumor was formed by a large nucleous fixed by a prolongation to the occipital bone; from this nucleus radiated several streaks of cartilaginous tissue.

Certain osseous tumors, distinct from enostoses, nevertheless, on account of their projection into the cranium, have the same apparent characters and the same deleterious effects as these latter. Such are deviations of the osseous laminæ which separate the cranium from the frontal sinuses.

Renault has seen a remarkable instance of this kind in the horse. At the anterior part of the cranial cavity, a little above the cribriform plate of the ethmoid bone and in each side there was found an eminence in form and volume of half that of a pigeon's egg.

The larger axis of these two eminences was directed antero-posteriorly; the osseous lamina which constituted them was thus at the summit. They were on the side of the sinuses and filled with a clear,ropy liquid, to which Renault believed they owed their formation (this is without sufficient reason, for the sinuses were not diseased).

Colin found in the frontal sinus of a cow a tumor which had broken through the frontal bone and strongly compressed the cranial contents. It was irregular in form and composed of several agglomerated masses; the surface was irregular, with elevations and depressions diversely disposed; the consistency was very hard and the substance of a bluish tint; its structure

was that of bone tissue (Goubaux); its weight was 827 grams and its volume 410 cubic centimetres. This neoplasm in many respects recalls the osseous tumors considered as ossifications of the brain.

We may ask, with Goubaux, if the case described by Colin does not show the mechanism of a particular mode of development. It can be seen, in fact, in the case of this enostosis originating in the frontal sinus, that at the same time that it pushed the frontal bone outward, it depressed the internal plate of the sinus towards the cranium, producing a partial absorption and then, freely penetrating the brain cavity, it displaced the encephalon.

MELANOSIS.

Melanotic tumors and infiltrations show themselves in the bones of the cranium, the meninges and the encephalon.

The *melanotic tumors* are ordinarily flat. Of two specimens seen by Goubaux in a horse, one was at the superior part of the cranium (left), between the bony wall and the dura mater, and the other in the left cerebral lobe under the pia mater; they were situated opposite each other and measured about three to four centimetres in every dimension. In the case described by Bouley and Goubaux, the tumor originated from the petrous portion of the right temporal bone and was prolonged into the suprasphenoidal canal of the same side. It surrounded and infringed upon the facial and especially the trigeminal nerve; finally it was completed by a melanotic infiltration of the squamous portion of the right temporal and parietal bones, the dura mater and the cerebellum. Bollinger has found a large melanoma in the cranium of a horse, in which diverse splanchnic organs were affected with melanotic deposits. It is common to meet melanotic masses in the cranium of a horse affected with generalized melanosis. The place of election is the base of the brain, around the pituitary gland. It then more or less envelopes this organ, as well as the optic chiasma, the vessels and the two large trunks of the trigeminal nerve; often the sphenoids also are invaded.

Melanotic infiltrations frequently exist in the bones, especially the temporal, sphenoid, occipital and parietal; they are also seen upon the choroid plexus where they form grains resembling small black beads; they are also found to a variable extent in the meninges, in the thickness of the cerebral

substance as an irregular deposit, or limited to certain organs—the pineal gland, for example. Without doubt the most remarkable instance is that seen by Denucé and Dupont in a cow. She had no melanotic tumors, but the connective tissues in all parts of the body, excepting the meninges and the choroid plexus, were black from melanotic infiltration; the melanotic material was also deposited between the cerebrum and the cerebellum, between the cerebellum and the pons varolii, and in the various fissures and grooves; it occupied only the superficial layers of the encephalon. Hurtrel d'Arboval has seen in a horse melanotic infiltration of the pia mater, while the brain substance was not involved. Finally, the venous sinuses themselves are often invaded by the melanotic material.

TUBERCULOSIS.

Tuberculous lesions in all stages of evolution have often been found in the meninges and the encephalon. The volume of the tubercular neoplasm varies from that of a miliary granulation to that of a hen's egg, and even larger. Tubercles are found in all parts of the brain, even within the ventricles; they invade especially the meninges at the base of the brain; voluminous masses, caseous or calcified, also occupy large areas in the cranial cavity, pressing upon the encephalon in the same manner as the osteomas described above.

The case reported by Moussu is particularly interesting. The subject was a heifer with a tubercular tumor of the volume of a hen's egg, which was imbedded in the cranium and by its compression determined an atrophy of the right cerebral hemisphere, without involving the meninges or the brain in the tubercular process. External to the cranium it had invaded the frontal sinus, the right horn core, the plates of the frontal bone, the periosteum and the subcutaneous tissue, thus determining a round, salient eminence in the space limited by the superior border of the frontal bone, the median line of the head, the orbital process of the frontal bone and the base of the right horn.

Dogs, although less frequently affected with tuberculosis than bovines, have also shown a certain number of instances of cerebral tuberculosis. Nocard has found on the inferior face of the medulla in a dog very small tubercles along the course of the arteries; other granulations were found in the

walls of the cerebral ventricles and on the floor of the fourth ventricle. In another dog Cadiot has found tubercular granulations on the inferior face of the medulla, along the basilar trunk and in the sylvian fossa close to the antero-internal border of the piriform lobe.

SECONDARY LESIONS.

The *secondary lesions* occasioned by neoplasms of the brain are important.

In view of their dimensions they infringe upon the volume of the cranial cavity. They compress the brain tissue and more or less completely lodge themselves in cavities on its surface. The encephalic mass becomes atrophied, which leads to its degeneration; atrophy of the convolutions and of the cerebral substance for a certain depth (tumors on the roof), atrophy of the striated bodies, the hippocampi, optic layers; distension, thinning and rupture of the septum lucidum, when the tumor is in the lateral ventricles, etc.

Over a more or less extensive area around the tumor, and, at times, even at points not in immediate contact with the growth, the brain tissue is the seat of variable alterations; congestion, inflammation, edema, softening, hydropsy of the lateral ventricles; the progress of these lesions is not necessarily continuous and fatal, and in some subjects the phenomena become arrested, at least in part.

The vessels and venous sinuses may be compressed by the tumor and become partially, obliterated and filled with clots. From this may follow edema of the brain and hydropsy of the ventricles.

The cranial nerves involved by the growth finally become altered and the organs which they supply become correspondingly affected.

The meninges are thickened, indurated, infiltrated with serum, or congested.

The growth of these tumors is influenced not only by the soft parts in the cranium, but also by the bony walls. The orifices destined for the passage of the vessels and nerves are enlarged by prolongations thrown out by the tumor, as in the case of Tisserand, in which the tumor protruded through the lacerated foramen and under the left wing of the sphenoid bone to the temporo-maxillary articulation and underneath the parotid

gland. The bony walls themselves sometimes give way, as in the case of Thion, in which the parietal bone was raised, thinned, and, at some points, perforated from the inter-cranial pressure.

Cancer, melanotic and tubercular tumors, independently of the effects of compression, have a tendency to spread. They infiltrate, disorganize and destroy the surrounding parts.

ABSTRACTS AND SELECTIONS.**RINDERPEST IN AFRICA.**

Governor Leutwein, of German Southwest Africa, has introduced energetic rules and regulations for the purpose of preventing the introduction of rinderpest. According to these recent regulations, the importation of all ruminants and ox teams from surrounding countries is positively forbidden, and also the importation of skins and horns. In addition to this, the soldiers and natives are directed to shoot all wild animals in the vicinity of the frontier that might introduce the plague, and in particular deer and antelopes.

The Transvaal has appropriated £300,000 sterling for the suppression of rinderpest among the cattle within its jurisdiction. This sum, amounting to \$1,500,000, is half of the total appropriations of the country for all purposes.

**AN IMPORTANT DISCOVERY RELATING TO THE
CONTAGIUM OF FOOT AND MOUTH DISEASE.**

Veterinarian Furtuna has just issued a preliminary report in reference to the above subject, in which he claims that Veterinarian Starcovici, after a study extending over several years in the Laboratory of Babs, has succeeded in isolating a microbe from cases suffering from foot and mouth disease, and that he has been able to produce characteristic symptoms of this disease in cattle by inoculating them subcutaneously with this germ, and also by feeding them with it. It is expected that Mr. Starcovici will publish a full report of his work within a short time.—J. ST. FURTUNA, Chief of the Veterinary Service of Roumania.—(*Berliner Thierärztliche Wochenschrift*, No. 43.)

This is an important announcement, for investigations of this matter have been under way in the laboratories of Europe for a long series of years, but all of them have resulted negatively. Recently the German Government offered a prize of several thousand marks to the discoverer of the cause of contagious foot and mouth disease, or aphthous fever. Of course

this affection has long been classed with the microbial diseases, but for some reason the specific organism has escaped detection.—ED.

Another communication in reference to the same subject has been printed in the *Clinica Veterinaria*, by Pinani and Fiorentini, who have made a considerable number of experiments and have arrived at the following conclusions: (1) In aphthous fever there is a pathogenic micro-organism that belongs to the class of schizomycetes. (2) In the exudate from the lesions of this disease that appeared on the skin and the mucous membrane of the tongue, and also in the tissues close to the eruptions as well as in the circulating blood, it is possible to find little bodies that differ from all of the normal elements of the organism or those found in ordinary inflammations. These bodies occur in the following forms: (a) Hyaline corpuscles of a moderate refractive index and from one-half to two μ in diameter. (b) Hyaline corpuscles that have a greater refractive index from two to four μ in diameter. (c) Corpuscles of from three to four μ in diameter, with a comparatively large nucleus, hyaline and low refractive index. (d) Hyaline corpuscles of from four to five μ in diameter, with a large hyaline nucleus. (4) These corpuscles frequently show pseudopodia, and some of them, when observed on the warm stage, make ameboid movements.

TREATMENT OF BOTRYOMYCOSIS WITH IODIDE OF POTASH.

As in the case of actinomycosis, the treatment of botryomycosis with iodide of potash has recently been recommended. Thomasson, who discovered the action of iodine in cases of actinomycosis, has treated horses with botryomycosis of the spermatic cord with ten grams of iodide of potash per day and local applications of tincture of iodine. He has observed good results from this treatment. Sigmund has used somewhat larger doses and also reports good effects.

Fröhner has treated a number of these cases after the same method, but has never been successful in curing his patients, although in some of them there has been appreciable improvement. He records that iodide of potash seems to suppress the phlegmonous swelling in the vicinity of the fistula temporarily,

but does not bring about a complete cure. Therefore Fröhner answers in the negative the question as to whether the owners of horses with fistula of the spermatic cord should be recommended to forego an operation, and holds that an early operation is the safest plan of treatment. In support of this contention he cites the following case:

A five-year-old sorrel gelding suffered from fistula of the spermatic cord for nine months. He was exceedingly emaciated but evinced no other indication of disease. There was no fever. Examination revealed botryomycosis of both cords, that had spread to the walls of the abdomen, and there was considerable swelling of the neighboring lymph glands, which extended forward a considerable distance along the linea alba. The swelling in the cord was as large as a man's head, hard and nodular, with a number of fistulous openings, and extended into the abdominal cavity. The discharge from the fistulous tracts contained numerous yellow lumps the size of a grain of wheat, which contained the parasite of botryomycosis in great numbers. The horse was bought for experimental purposes and subjected to the treatment with iodine. The fistulous tracts were treated with injections of Lugol's solution, and for three months the horse received iodide of potash with his food in doses of 5 grams a day. After 100 grams had been administered there was a perceptible diminution of the swelling and discharge of pus, but as the treatment continued the swelling became greater and at last considerably larger than it was at the beginning. On account of loss of appetite it was necessary to discontinue the treatment. After an intermission of ten days treatment was recommenced by giving 10 grams of iodide of potash every day, without altering the local disease in any degree. After a second pause of fifteen days, treatment was recommended with daily doses of 5 grams of iodide of potash but with no apparent effect.—PROFESSOR FRÖHNER, Fröhner-Kitt's *Mtsch.*, Bd. VI-II.

CANADIAN QUARANTINE AGAIN.

Dr. Salmon says, in justification of the order permitting Canadian cattle to be shipped through the States to the Atlantic seaboard for export, that Canadian cattle have for a number

of years been permitted to cross a portion of the United States for export from the port of Portland, Me., and that no contagious disease has been discovered among them by our inspectors. The Department of Agriculture, he says, has never received any satisfactory evidence that pleuro-pneumonia exists in Canada or that it existed there in 1892, and does not consider that there is any great danger of the disease being introduced into this country with Canadian cattle.

English inspectors claimed to have discovered pleuro-pneumonia in Canadian cattle, October, 1892, and they became subject to the same regulations as cattle shipped from the United States by order issued November 1, 1892. These regulations still apply to Canadian cattle the same as our own. Canadian cattle were permitted to be shipped from the port of Boston in August, 1896. There is a quarantine of ninety days on our cattle in Canada. Such cattle are not at present allowed to be exported from Montreal or any other Canadian port. Canadian cattle are permitted to enter the United States to be placed on sale by the payment of a specified duty and after being subjected to a quarantine of ninety days.

The Department of Agriculture requires that all Canadian cattle shipped through this country for export shall be accompanied by a certificate of competent local authority showing that no disease exists. These cattle are subjected to a rigid examination at Richford, Vt.—*The Breeder's Gazette*, November 11, 1896.

DANGER IN BUYING STOCK HOGS.

The loss that comes to farmers who buy hogs from stock-yards and drovers is hard to estimate. The abundance of corn leads farmers to increase the number of their feeding hogs and cattle, and in their eagerness to buy many of them seem to lose sight of the danger of introducing disease on their farms. Many farmers have had no experience with the pestilence, and it is difficult to impress them with the insidious and deadly nature of hog cholera. They will even buy hogs that are sick, coughing and weak, because they can be bought cheap. To such we say—Take the lesson of experience dearly learned by others. As sure as a fire started in the dry leaves will spread over one's farm and on to the neighboring farms where there

are dry leaves and other combustibles, so surely will the germs of disease in cholera pigs spread to others on the farm and to neighboring herds.

As long ago as 1868 the writer was told by the superintendent of the East St. Louis stockyards that he had refused to fill orders for stock hogs. He had often sent on order carloads of nice, thrifty-looking hogs to farmers and been complimented on his selection. Usually in about two weeks would come another letter telling him the hogs were dying and the other hogs on the farm were sick. This was so common that he had learned not to fill such orders. If the buyer came to the yards and made his own selection the pigs were sold, but the disease followed as certainly. He concluded that healthy hogs shipped in often-used stock cars or occupying a pen in the yards were as surely inoculated with hog cholera as a person who slept in a room or bed with a small-pox patient would be affected with small-pox. His opinion has been verified by the experience of thirty years, and yet there are men who will take the risks of introducing the deadly disease on to their own farms and into their neighborhood.

We had a letter from a friend in a central county of Pennsylvania some years ago asking what to do for his hogs. He had ordered a carload of hogs from East Liberty and was well pleased with them on arrival. He had been born and raised on the farm that he had inherited from his father, who raised hogs, but had never bought any from a distance. Hog cholera was unknown in that county until the stockers came from East Liberty, and although our letter told him his pigs had the cholera and that his only hope was to quarantine them and prevent its spread, and especially not to allow the sick hogs to pass from pen to pen or lot to lot on his farm, he and his neighbors lost a majority of their hogs and the disease appeared the following year. This is but a sample case of thousands.

The inexperienced are yet buying feeders from stockyards and losing their purchase, as well as their home-grown hogs and their corn crop, and spreading the pestilence among their neighbors' herds. Boards of health prevent the spread of small-pox, scarlet fever, diphtheria, and other filth diseases. The remedy is cleanliness, disinfecting the homes, clothing and bedding of patients and preventing the sick from coming in contact with the well. Until we can have similar treatment of

hog cholera and have power to prevent the shipment of sick hogs to well ones, and well ones from going into infected cars and yards, we will have outbreaks of the disease in new localities, forming new centres to destroy the herds of the inexperienced and defying the treatment of the most skillful veterinarian and the bravest peddler of cholera cures.

Until the Government takes hold of stockyards and transportation lines with vigor enough to compel them to furnish cars and pens that are not loaded with germs of death, the farmer's only hope is to limit his feeding to his own raising and use every precaution to prevent the importation of disease to his own farm. This means eternal vigilance and thorough acquaintance with the nature of the disease and the importance of clean quarters, pure water and sound feed. It means hatred of filth and a keen eye to detect symptoms of disease. It means prompt and heroic treatment as soon as disease appears, even to the destruction of valuable animals, and purification of pens by fire if need be. The breeders and farmers of America have fought their enemy at great odds. The disease has been allowed to spread wherever stock cars may carry it and ignorance foster it.

The breeder and farmer must buy new blood, but intelligent handling of such purchases will prevent the inoculation of the home-grown stock. The new purchases ought to go into quarantine for three weeks or a month, and the crates be disinfected, and the litter in them burned before it can be scattered by fowls or on the feet of attendants. There must be no going back and forth from the lot and pen of new arrivals to those of the home herd. A little thorough-going work and care will prevent much loss.

It will not do to assume that the pigs just bought are healthy and there is no need of the fuss of quarantine. The day for such defiance of sanitary laws is past.—*The Breeder's Gazette*, November 11, 1896.

ANIMALS' ILLUSIONS.

A curious instance of animal illusion, says the *Spectator*, was seen on the Thames a few days ago by those on their way to Henley by river. A cock swan was fighting his own reflection seen in the window of a partly-sunken house boat, which acted

as a looking-glass. He had been doing battle for some time in defence, as he supposed, of his wife and family, who were grouped together close by, and had apparently begun to have some misgivings as to whether the enemy was real or not, for at intervals he desisted from the attack, and tapped the frame of the window all round with his bill.

Birds are, perhaps, more commonly the victims of illusions than other animals, their stupidity about their eggs being quite remarkable. Last year, for instance, a hen got into a pavilion of a ladies' golf club, and began to sit on a golf ball in a corner, for which it made a nest with a couple of pocket handkerchiefs. But many quadrupeds are not only deceived for the moment by reflections, shadows and such unrealities, but often seem victims to illusions largely developed by the imagination. The horse, for instance, is one of the bravest of animals when face to face with dangers which it can understand, such as the charge of an elephant or a wild boar at bay. Yet the courageous and devoted horse, so steadfast against the dangers he knows, is a prey to a hundred terrors of the imagination due to illusions—mainly those of sight, for shying, the minor effect of these illusions, and “bolting,” in which panic gains complete possession of his soul, are caused, as a rule, by mistakes as to what the horse sees, and not by misinterpretation of what he hears. It is noticed, for instance, that many horses which shy usually start away from objects on one side more frequently than from objects on the other. This is probably due to defects in the vision of one or other eye. In nearly all cases of shying the horse takes fright at some unfamiliar object, though this is commonly quite harmless, such as a wheelbarrow upside down, a freshly-felled log, or a piece of paper rolling before the wind. This instantly becomes an “illusion,” is interpreted as something else, and it is a curious question in equine neuropathy to know what it is that the horse thinks those harmless objects are. When Russian ponies first began to be shipped to Harwich they usually objected to pass near a donkey. This reluctance was explained on the hypothesis that the ponies seldom saw donkeys in Russia, and mistook them for bears; but that is hardly an illusion which is the effect of a mental misinterpretation of outside phenomena.

“Understanding,” or investigation to that end, does often remove the equine illusions. Young horses can be led up to a

sack lying on the ground and induced to pass it, by letting them smell it, and find out that it really is a sack, and not the Protean thing, whatever it may be, which illusion conjures up for them. Once the writer saw a very quick and pretty instance of experiment by touch made by a frightened pony. It was being driven as a leader in a pony tandem, and stopped short in front of where the rails of a steam tramway crossed the road. It first smelt the near rail and then quickly gave it two taps with its hoof. After this it was satisfied and crossed the line.

On the other hand, a donkey always tried to jump the shadows of tree-trunks on the road, though a similar experiment of touch would have shown that these were as unreal as the tram-rail was substantial. Lastly, no horse which has once knocked its head against the top of a stable doorway, seems able to get rid of the illusion that there sits up in the top of all doorways an invisible something which will hit him again next time he goes through. Hence the troublesome and sometimes incurable habit of horses "jibbing" when taken out of the stable. This is an obvious instance of the disadvantage at which most animals stand, in regard to means of physical experiments. The horse, for instance, need only feel the lintel to find out that it is fixed and does not move, and is not alive and waiting to hit him. But, except his lips, which are sensitive, he has no member with which he can make the experiment. Except the elephant and the monkey, most of the higher animals suffer from this lack of the means of experiment. The wonder is, not that they suffer from illusions, but that they make so few mistakes.

The routine of chemical experiment gives some idea of the common sense by which we guard against mistaking one thing for another. The inquirer notes the taste, scent, and color, and judges of the weight, solubility, and, in the case of crystals, of the shape of the object he wishes to identify; he tries if it is brittle or tough, he heats it or cools it. In common everyday experience the number of "tests" unconsciously applied by men to prevent illusion and identify objects, approaches much more nearly to the number prescribed for scientific inquiry, than to the simple experiments by animals. There is even a test for a ghost, which, since quoting Latin to it fell into disuse, usually takes the form of seeing if it is "sensitive to percussion." Now even this simple experiment is denied a

horse when uncertain as to the reality of a figure seen by twilight. In the absence of a hand, sense of touch is deficient in most animals. This, except in the case of birds, is not compensated by special acuteness of sight, though nearly all animals apply a sensible test to ascertain whether the object is living or inanimate. They wait to see if it moves; and to do this they know that the first condition is to keep absolutely still themselves. Most of the larger birds, notably wood-pigeons, remain perfectly motionless for many seconds after alighting in a new place, in order to identify any moving object. On the other hand, the power of scent is a great corrective to animal misconceptions about objects. It is their chief means of distinguishing the animate from the inanimate, and is always employed by them in the diagnosis of *death*. It would be interesting to know whether camels and horses share the illusions produced on men by the mirage in the desert, or whether they are all the time aware that the seeming lakes of water are unreal. It is certain that they are frequently mistaken in sounds, for there are many authenticated instances in which animals have mistaken the mimicry of parrots for the call of their masters, and a nervous dog, which had a special dread of thunder, has been known to go into a fit when it heard a sack of coals being emptied into a cellar.—*Veterinary Journal*, August, 1896.

FROZEN MEAT.

It is a well-known fact that butcher-meat can be preserved almost indefinitely, provided it be kept in an atmosphere whose temperature is constantly below freezing-point. In a report to the President of the French Republic, in 1891, M. de Freycinet, Minister of War, says: "It is an ascertained fact that frozen meat kept at a low temperature can, even after preservation for a long time, be substituted for freshly-killed meat, and that the dealer need fear neither loss nor difficulty in handling, nor any repugnance on the part of the consumer. It has been further demonstrated that the distribution of such meat may be accomplished, without any precautions, to places so far distant from the freezing-chamber as to require a journey of two days to two days and a half, and this in the hottest weather." This authoritative statement prepares us for the statistics of

the dead-meat trade, which show that in 1895, there were imported into France, 116,500 carcasses of sheep, and 4500 quarters of beef, in a frozen condition. Out of this total 40,000 sheep and 600 quarters of beef were sold in Paris.

In foreign countries which consume frozen meat, such as England, there is no display of the meat on counters. The purchaser comes and selects his joints—often of great weight—in the cold chamber, and has them sent home at once; besides, these purchases take place only at certain hours of the day. When thus treated, the meat is undoubtedly a success, and looks very well on the table. In Paris, the frozen mutton is principally bought by hotel keepers and restaurateurs; the army also consumes a quantity.

I have myself eaten many a leg of frozen mutton. Having bought it in the morning a veritable lump of ice, I place it, shank downwards, in the kitchen, and wait till it is completely thawed—some seven or eight hours. At the expiration of this time it is easy to see that not a drop of juice has fallen to the ground. Then I have it cooked, and every time that I act thus I get a capital joint, juicy when cut up and quite tender, but slightly deficient in flavor. When such precautions are taken, one may say that frozen meat is good and may prove of great utility to the population of large towns and to the army. But is this the usual custom and the usual result? I am afraid not, especially since attempts have been made to import frozen meat from South America and from Australia. In the case of sheep, cut in four as required by law, we have to deal with flesh which, not being thick at any point, allows the process of thawing to go on at the same time on the surface and in the deeper parts. The drawback in this case is not so serious. But beef, when treated in the same fashion, offers more resistance to the thawing process; it softens slowly and displays ugly colors—a serious disadvantage which traders have tried to get rid of, but hitherto without success. Mutton is sold rapidly, being easily handled and cut up, and there is very little waste. Beef, on the other hand, has to undergo an infinity of cutting before it is divided into pieces suitable for roasting or boiling. These various operations never fail to spoil the beef, because they expose so many surfaces to atmospheric influences. Thus, we see quarters of beef frozen all over and with a fine appearance when they have just come from the cold chamber; our

surprise is great, however, when we see them a short time afterwards, thawed and fragmentary, presenting colors that are anything but pleasant and certainly not appetizing.

Here I would state parenthetically that in cold weather, when the temperature is about freezing-point, all fresh butcher's meat assumes a bright red tint, which has a very pretty effect. If the cold increases, the cut surfaces become darker, browner, and we see little ice crystals in the interstices. As a general rule, we may say that the color of meat has a great influence on its value. It depends greatly on the age, sex, race, mode of feeding—factors with which, however, we have nothing to do at present.

Some hours after leaving the freezing chamber, when the temperature is pretty high, the whole surface of the quarter of beef is a faint white color, as if sprinkled with starch, or rather as if it had been washed with soapy water. This color is fugitive, and soon gives place to more enduring colors. The fat becomes, at the end of three or four days, of a dull yellow, something like old wagon-grease; sometimes it goes further, and assumes the color of yellow ochre, is even greenish in places, without, however, giving forth any bad smell. One might almost say—and it is important to note the fact—that such has been rendered imputrescible, or little liable to putrefaction, the low temperature to which it has been subjected having destroyed the germs of fermentation. The external color of certain muscles is dark purple, brown, here and there chocolate; it changes wonderfully when a deep cut has been made, and shows a bright red, recalling, as it were, the life in which the surface, so thoroughly modified, seems no longer to take part. Standing by, and watching the various changes which the meat undergoes, when exposed to dry atmosphere, watching the juice as it drips to the ground, and the fat as it becomes dull in hue, and presents the appearance of the fat of a dead body, we perceive, I repeat, no disagreeable odor, let our sense of smell be as acute as it may. If we wait a little longer, and if a damp cold come on, the meat will become "sticky" on the outside, and will soon give forth the smell of mustiness, which we all know so well. It will become covered with fine mould of various colors—black, yellow, green or gray (*aspergillus*, *mucor*, *penicillium*), with downy tufts, such as grow on jam. These mouldy patches seize first upon fat,

and afterwards on the muscles, and are very tenacious and very obstinate; a brush cannot remove them altogether, a knife is required. Mr. Marchal, an army veterinary surgeon, in a book recently published, "Butcher-meat Preserved by Freezing," recommends distinctly that meat should not be transported from intense cold to a temperature relatively high; he says it is better to expose it first to a current of dry air, and recommends not only thorough ventilation but frequent rubbing with linen cloths, in order to prevent the musty smell.

It has been admitted by sanitary authorities that it is necessary to withdraw from the public consumption all "sticky" meat in which the smell of mustiness and damp is perceptible. I have taken the same line of conduct with regard to mouldy meat, as I cannot admit that meat can be considered fresh which has many specks of mould about it. We may show toleration in dealing with superficial decay in jam, in cheese, in hams, in the envelopes of certain sausages, and generally with the externals of food preserved with sugar or with salt, but I think we ought to be more rigid in the inspection of bread and fresh meat, these substances which decay rapidly, and which ought therefore to be rapidly consumed; they are at the same time essential elements in the food of the human race, and we have a right to demand that they be presented to us without any trace of damage.

These assertions, easily established even by a hasty examination of meat, are not the only ones which it is desirable to establish. Meat, whether beef or mutton, which has been kept continuously frozen from the moment of entry into cold chamber, either on board the ship which has to carry it from its place of origin to France, or in the warehouses of the large towns, loses some of its qualities if the cold is not maintained, if a complete thaw supervenes, and more especially if it has to be frozen a second time. We have already seen that thawing had for its effect by softening the meat, to give it peculiar and unpleasant tints, and to cause in certain parts, where the cellular tissue is loose and abundant, the escape of a considerable quantity of its juice.

If we refreeze these pieces of the meat that have been thus "melted," the intense cold seizes them in their new condition without in any way modifying their external appearance, or rather we may say that when the meat is rethawed and

exposed for sale, we find ourselves in presence of meat that is quite different from the original, destitute of brilliancy, without the original bright color, but presenting indescribable tints in its fat and a dull purple hue in its sticky, viscous muscles. On cutting it up, the knife will find all the serum that has escaped, flooding the muscles with a magma, or thick viscid substance somewhat like marmalade in consistency. Even there we perceive no bad odor; nothing is exhaled from this "jellified" flesh, absolutely nothing.

The question now is, ought such meat to be condemned? I have debated this question with myself for a long time and I have come to the conclusion that there is nothing to do but to withdraw from sales carcasses which have undergone congelation after several thawings, and whose repulsive appearance when once thawed reminds me always of anatomical subjects that have been macerated. Still I confess that I lack a clear basis of judgment and I should be glad to have further data. I had always thought that with frozen meat one might pass all kinds, good and bad, and that our means of investigation were often incapable of discovering, amongst pieces several times frozen and thawed, those which ought to be withdrawn from consumption; this is why, in the present paper, I have endeavored to trace out a line of conduct to be pursued with regard to meat that has been twice or thrice thawed in course of transit, has given up to the surrounding air all its juices, and has finally become limp in the butchers' shops or in the markets. I say that then—when it has become weather-beaten, parched, dull and dirty-looking, and unpleasant to the eye—it ought to be withdrawn from the market as being neither wholesome nor merchantable.

Frozen meat ought not to be carried about from one shop to another. To spread it out in windows, or on benches, seems to me absurd; even to hang it up in central markets, at any rate in damp weather, is equally foolish. Just in proportion as such meat is pleasant to the eye when it comes out of the freezing chamber, with its bright colors unimpaired and sparkling with its myriads of frost-crystals, so does it become disgusting after two or three days' exposure to the open air. Those who wish to maintain the credit of frozen meat must present it to the public in a favorable light, and not wait till it has lost, by long exposure to the air, all its best qualities.

The following notes are interesting and important: M. Lagarde, of Havre, made investigations in 1878 as to the length of time that a sheep's carcass would remain sound after coming out of the freezing-chamber, when exposed to the air. It was placed on the tenth of May in a cellar, where the experiment was to take place, and on the fourteenth it was decomposing. A second trial, which began on the eighteenth, ended in the same way on the twenty-second.

M. Morot states that when meat is enclosed in a place subjected to a temperature of 32° to 30° Fahr. it can be preserved almost indefinitely. My own experience shows that a temperature of 23° to 21° Fahr. is necessary for indefinite preservation. Experiments made by myself in public markets show that frozen meat cannot be exposed continuously to the air for more than two days without danger of decomposition, especially when the temperature is high.—*M. L. Villain, in the Recueil de Méd. Vét.*

COMMUNICATIONS.

PENNSYLVANIA STATE BOARD OF VETERINARY EXAMINERS.

PHILADELPHIA, Pa.

A special meeting of the State Board of Veterinary Examiners was held in Harrisburg in the Capitol, October 20 and 21. Five applicants were examined for a license to practice in the State of Pennsylvania, of whom three were successful: W. H. Yingst, Harrisburg, Pa., and F. H. Schneider, Ashland, Pa., from the New York Veterinary College; and J. H. Burt, Union City, Pa., Ontario Veterinary College.

The members of the Board present were: Drs. W. H. Hoskins and S. J. J. Harger, of Philadelphia; J. C. McNeil, of Pittsburg, and J. W. Sallade, of Pottsville.

The next special meeting will be held December 15 and 16, to examine new applicants, and those who failed at the April and June examinations.

For any information applicants should address the secretary, 205 North Twentieth street, Philadelphia.

W. H. HOSKINS, *President.*

S. J. J. HARGER, V. M. D., *Secretary.*

PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION.

Newspaper Bulletin No. 36, October 10, 1896.

HOG CHOLERA: SUGGESTIONS TO SWINE GROWERS.

Last year Indiana lost 580,260 hogs by disease, entailing a property loss of three and a quarter million dollars. Nearly the entire loss was due to cholera and swine plague. It was distributed as follows: In 232 townships the loss was from 10 to 20 per cent; in 127, from 20 to 30 per cent; in 59, from 30 to 40 per cent; in 53, from 40 to 50 per cent; in 24, from 50 to 60 per cent; in 12, from 60 to 70 per cent, and in one 77 per cent, while the remainder lost less than 10 per cent of all the hogs that were produced.

The disease is well disseminated in the State this fall, and the season of greatest loss will soon be upon us. Every effort should be made to lessen its ravages as much as possible. An important factor in reducing the loss is to provide proper shelter, as all hogs with only a mild attack, or having apparently made a recovery, may take a relapse if exposed to a cold rain or a sudden change to rough weather. There are thousands of hogs now in a condition to become affected with pneumonia, which would escape if given a little protection. Any shed which will keep off the rain and break the wind is sufficient. The floor should be dry, but little bedding is needed, and that renewed frequently. Burn all litter and bedding once a week. Keep the herd divided so that crowding is impossible. Remember! a straw stack is the most unfavorable place that can be provided for sick hogs.

The essentials in prevention are good food, *pure water* and *clean, dry quarters*.

The station would be pleased to receive information from any source as to the presence of the disease and of all successful ways of checking it.

Address

A. W. BITTING,
Experiment Station Veterinarian, LaFayette, Ind.

GERALD McCARTHY: Parasites of Domestic Animals, Bull. No. 127, North Carolina Agricultural Experiment Station, pp. 101-142, figs. 1-33.

This entire report, so far as the worms are concerned, is probably the richest conglomeration of pseudo-scientific nonsense which has recently been issued from the press of this country, and if the paper did not bear the seal of the State Experiment Station, one would almost believe that Mr. McCarthy had issued the paper as a joke rather than as a serious discussion.

The farmers of North Carolina are given the following [mis-] information regarding animal parasites :

P. 110. In the discussion of *Cysticercus bovis*, it is stated that *Tænia echinococcus*—which by the way is probably the most fatal animal parasite in existence, is “rare and of no great importance.”

P. 110-III. " *Distoma hepaticum* . . . Never allow dogs to eat infested flesh, for they will spread broadcast the eggs of the mature worm."

P. 130. " *Cysticercus cellulosus* . . . Occasionally a pig will eat a piece of measly pork or a rat, or some animal infested by the measles-worm, which, then in the intestines of the pig, develops into the mature form or tape worm." !!!

P. 135. "Cats are difficult to kill even by parasitic worms" —(How would a shot-gun do?)

P. 137. " *Tænia solium* . . . the common tapeworm of humans. This worm often infests the dog and pig, both in the larval state . . . and in the mature or 'tape-worm' stage. Dogs and pigs obtain the mature worms by eating measly pork, or rats, or mice . . . The dog is scarcely less active than the pig as a carrier of this disease to humans. It has probably caused more children to become infested than has the pig." !!!
(Do the children of North Carolina feed on dogs??!)

P. 138. " *Uncinaria trigonocephala* . . . the dogs become infested by eating the foxes!"

These citations, taken at random, will suffice to show what utter nonsense the author has dished out to the farmers of North Carolina. Is there no way to prevent such publications from ever seeing daylight?

STILES.

VETERINARY SURGEONS UNITED STATES ARMY.

THE VETERINARY BILL.

H. R. 3012, Mr. Dovener.

S. 1240, Mr. Roach.

A BILL TO FIX THE PAY, ALLOWANCES, TENURE OF OFFICE, AND RANK OF THE VETERINARY SURGEONS OF THE UNITED STATES ARMY.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Veterinary Surgeons of the United States Army shall be given the pay, allowances, tenure of office, and rank of second lieutenants of cavalry.

SEC. 2. That the number of veterinary surgeons in the Army of the United States shall not exceed two to each regiment of cavalry.

SEC. 3. That hereafter all appointments as veterinary surgeons in the Army of the United States shall be confined to graduates of recognized veterinary colleges, and candidates for such appointments shall be citizens of the United States and shall be required to pass such examination as the Secretary of War may direct.

The status given veterinary surgeons by this bill is approved and strongly recommended by army officers, from the Commanding General down. The letter of the Adjutant-General United States Army, which is made part of the favorable report of the Military Affairs Committee, as given below, is a fair sample of the expressions of army officers.

Mr. Hull, of the Committee on Military Affairs, submitted the following report:

[To accompany H. R. 3012.]

The Committee on Military Affairs, to whom was referred the bill (H. R. 3012) to fix the pay, allowances, tenure of office, and rank of the veterinary surgeons of the United States Army, have had the same under consideration, and amend it

by striking out, in lines 3 and 4 of Section 3, after the word "colleges," the words "of the United States," and as amended recommend the passage of the bill.

The report from the Adjutant-General of the Army is hereto attached and made part of this report.

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, February 18, 1896.

Sir.—I have the honor to return herewith a bill (H. R. 3012) "to fix the pay, allowances, tenure of office, and rank of the veterinary surgeons of the United States Army," on which the House Military Committee calls for report.

The veterinary surgeons in the army of the United States are employed for service with cavalry regiments. Six regiments have one veterinary surgeon, who receives \$75 per month, and four regiments have two, one of whom receives \$100 per month, and the other \$75 per month.

These men are civilians, and their terms of office depend, in great measure, upon the pleasure of their respective regimental commanders, on whose recommendation they are appointed. Their duties require them to attend public horses at the post at which they may be stationed, or of the regiment when consolidated, whenever such animals are in need of medical treatment. These veterinary surgeons are necessarily dependent upon enlisted men for the assistance they may require in such treatment, and must give orders to these soldiers.

The treatment of a sick horse is more difficult than that of a sick man, although their ailments are similar, for the reason that the man is able to describe his symptoms and the animal can not do so. The veterinary surgeon is therefore entirely dependent upon what he alone can discover as to the ailment of his patient.

The pay of a veterinary surgeon, as now established, is hardly sufficient to command, permanently, the talent and ability of such skillful professionals as are really required for the Government. It happens at times that young men just from colleges come into the service and, after having gained experience, leave for civil life and more remunerative employment.

In the British and Italian armies veterinary surgeons are commissioned officers with military titles, of which the highest

is that of Veterinary Colonel. In Germany and Austria they are military officials, but not technically officers. In France they have the status of commissioned officers, with grades which correspond with those of the military establishment to include that of lieutenant-colonel.

It is believed that by giving to veterinary surgeons the rank, pay, and tenure of office contemplated by this bill the army will secure better veterinary service than it can at present; that the efficiency of the cavalry arm will be increased, and that, as the result of the better care of public animals, much money may be saved to the Government. The bill is accordingly recommended for favorable consideration.

Very respectfully,

GEO. D. RUGGLES,

The SECRETARY OF WAR.

Adjutant-General.

The control of the troop commander over his horses under treatment by the veterinary surgeon, is a great drawback, as it prevents the latter from using his judgment and energies in critical cases, for it is almost certain that a difference of opinion will exist and all exact knowledge gained by years of study in college and in practice goes for naught against the prejudice, superstition, and technical ignorance of the Troop Commander.

A veterinary surgeon is the only competent person to treat sick or injured animals, and he alone should be responsible for their proper treatment, but this he never can be unless he is made so responsible as a commissioned officer, as provided in said bill.

When it is considered that the pecuniary value of army animals amounts to two and a half millions of dollars, this matter of veterinary service becomes a serious question of economy to the Government.

Congress gave rank to medical officers almost one hundred years ago, in order to secure physically-sound men at enlistment and to give said medical officers control over sick and disabled soldiers.

This bill would make the veterinary surgeon responsible for the soundness and fitness of horses coming into the service, give him control over sick and disabled horses, and make him responsible for their proper treatment.

The higher duties of a veterinary surgeon—those of horse expert, sanitarian, purchaser, and instructor of officers and farriers—seldom receive due respect. Very rarely is he consulted in the purchase of public animals, and even when so consulted, his opinions are treated lightly because he has no rank to back them up. The result is that the horses are purchased by an officer who, lacking all technical veterinary training, falls an easy prey to the horse contractors, and thus a large percentage of the one hundred and fifty thousand dollars' worth of horses purchased annually for the army are unsound or anatomically unsuitable for the service.

In the condemnation of horses the veterinary surgeon is *never* consulted, such duty being assigned to an inspecting officer who, not being an expert, makes many mistakes which would not occur if a commissioned veterinary surgeon, *with the rights and privileges conferred by a commission*, were detailed to assist the inspecting officer.

The result of this lack of advice from trained veterinary experts is an annual loss of from ten to twelve per cent of the animals in the army—a greater loss than occurs in the army of any other civilized country.

All matters relating to horses, such as shoeing, feeding, general management, veterinary supplies, etc., are regulated by officers who have no technical training in such matters, resulting in large losses.

If veterinary surgeons were commissioned they would be placed on all such boards and would be authorities in such matters. This would result in a saving to the Government of enough money every year to more than pay the officers provided for in said bill (\$21,000), while the salaries now paid (\$13,800) do not receive an adequate return in beneficial services, owing to the many reasons above given.

PROCEEDINGS OF SOCIETIES.

COLORADO STATE VETERINARY ASSOCIATION.

The semi-annual meeting of this Association was called to order at 3 p. m. Oct. 28, at the office of the president, Dr. S. Bock, No. 1250 Glenarm St., Denver, Col., the president, Dr. Bock, in the chair.

The following members answered to roll call: Dr. S. Bock, Dr. F. W. Hunt, Dr. Charles G. Lamb, Dr. Charles Gresswell, Dr. W. A. Rushworth, Dr. E. Pouppirt, all of Denver, and Dr. D. P. Frame, of Colorado Springs. Dr. A. J. Savage, Colorado Springs, was a visitor.

The principal object of calling the meeting at this time was to consider the matter of legislation in behalf of the profession in this State this winter. The old bill which was introduced two years ago was taken up and re-considered, and, after some few alterations and the addition of two amendments, it was considered satisfactory.

The principal amendment made was that of Sec. 5, permitting those non-graduates who have practiced continually in the State for five or more years to register under the new law.

Moved by Dr. Gresswell, that the regular meetings of this association in the future be held on the Tuesday following the first Monday of January and July of each year. Carried.

Dr. Frame proposed the name of Dr. A. J. Savage for membership, and the doctor was at once elected a member.

Drs. Gresswell and Rushworth were appointed to read a paper on Glanders at the meeting in January.

Dr. D. P. Frame was appointed to superintend the introduction of the proposed new bill in the legislature this winter, and to represent the association in the consideration of the same.

It is proposed to now hold regular semi-annual meetings of this association, as we have been organized for over two years, and have been making some effort to secure legislation in our behalf. We hope to succeed in our effort this winter.

The next meeting of this association will be held in Denver, January 5, 1897.

D. P. FRAME,
Secretary.

MONTREAL VETERINARY ASSOCIATION.

The twenty-second annual opening meeting of the Association was held in the Library of the Faculty of Comparative Medicine, Thursday evening, October 8. President, Dr. D. McEachran, occupied the chair.

Dr. McEachran spoke of the great value of veterinary societies to the students and to the profession.

Election of Officers:—President, Dr. Baker; First Vice-President, Dr. Mills; Second Vice-President, Dr. C. McEachran; Librarian, Dr. Thurston; Secretary and Treasurer, B. A. Sugden.

Eight new members were added to the roll.

The second meeting of the Association was held in the Library, Thursday evening, October 22. The President, Dr. M. C. Baker, occupied the chair. There was a good attendance of members.

The secretary was instructed to obtain "Metchnikoff's Researches in Comparative Inflammation," and Dr. Clement's work on "Post-Mortems," for the Library.

Mr. W. B. Wallis reported a case of parturient apoplexy in the cow, rendered especially interesting by the subsequent occurrence of subcutaneous emphysema. The latter he attributed to traumatism of the lung, which accords with Ziegler's theory that the condition may occur by the passage of air through a wound in the lung, and extension by way of lymphatic and connective tissue spaces, to the subcutaneous tissue. This case made a good recovery under stychnia and stimulant treatment. The President pointed out the ample field for research which this disease presented.

Dr. Martin, in his remarks on emphysema, showed that in man the condition was mainly of microbic origin, being due to certain air-forming bacilli.

Mr. Burns read a paper on "Nursing and General Management of the Sick." After discussing pure air, scientific and rational methods of feeding, etc., he showed how seldom these fundamental principles were put into practical use in veterinary medicine. Mr. Burns illustrated by diagram several plans of ventilation and drainage which he had personally observed in some of the large cities of the United States. One plan of ventilation consisted of an air shaft which ran all round the stable above the stalls and boxes; over each stall and box were apertures in the shaft which could be opened and closed at will, according to the condition of the patient occupying the space below.

Dr. Martin pointed out that a large proportion of animal ailments were caused by irritation of the gastro-intestinal tract, due to irregular and improper feeding.

B. A. SUGDEN,

Secretary and Treasurer.

THE VETERINARY ASSOCIATION OF NEW YORK COUNTY.

The regular monthly meeting of the Veterinary Association of New York County was called to order at 8.30 p. m., October 7, by the President, Dr. Huidekoper, at the Academy of Medicine.

The following members responded to the roll call. Drs. Delaney, Dair, Ellis, Giffen, Gill, Huidekoper, Hanson, Loomes, Machan, MacKellar, Neher, Robertson and Ryder.

Report of the Board of Censors.—Dr. H. D. Gill, Chairman.

Dr. S. K. Johnson's case : The charge against Dr. S. K. Johnson for breach of the Code of Ethics was referred back to the Association, as the following motion relative to the case had been passed at a meeting held April 7, 1896 :

"Resolved, That the Board of Censors recommend to the Association that if the said Dr. S. K. Johnson does not show satisfactory evidence of having resigned and severed all connection, directly or indirectly with the said insurance company on or before October 15, 1896, he be expelled as a member of this Association."

Report accepted.

Dr. H. Clay Glover's case : The charges against Dr. H. Clay Glover were for a breach of the Code of Ethics and the improper and illegal use of the title D. V. S., and he was recommended to the Association for expulsion. The board also suggested that the attention of the Judiciary Committee be called to the latter fact.

Report accepted.

Information having come to the Board of Censors that Meat Inspectors employed by the New York City Health Department and the Bureau of Animal Industry were not veterinarians, and consequently illegally practicing, the matter was referred to the Judiciary Committee for immediate action.

Papers.—Dr. W. Herbert Lowe, of New Jersey, read a paper on "Heredity."

The following gentlemen presented applications for membership in the Association : F. E. Winslow, Flushing, L. I., and J. W. H. Wright, of Long Island City.

ROBERT W. ELLIS, D. V. S., *Secretary.*

PENNSYLVANIA STATE VETERINARY ASSOCIATION.

READING, PA., October 6, 1896.

The members of the Association assembled in Y. M. C. A. building and were called to order at 10.15 a. m., by the President Dr. W. H. Ridge.

At roll call the following members responded : Drs. Allen, Benner, Collins, Harger, Hart, Helmer, Hoskins, Houldsworth, Lusson, J. C. Michener, Ridge, Noack, G. B. Raynor, T. B. Raynor, Bachman, Dreibelbis. Visitors, Drs. Burkholder and Hogg. The president then introduced the Mayor of Reading, Mr. Weidel, who warmly welcomed the Association to his city. Dr. Hoskins responding in behalf of the Association, thanked the Mayor for his words of welcome. Applications for membership, Dr. George Jobson, Jr., Oil City; H. Howard Wilson, Hatboro. Elected by acclamation. The resignation of Drs. C. H. Magill, Augustus Koenig, J. C. Blaker and H. J. Clelland were accepted. The President asked that their certificates be returned to the Association. Drs. Harger and Felton then offered the following :

Resolved, That the name of the Association be changed to "Pennsylvania State Veterinary Association."

Under unfinished business, the Resolution, that Section 2, Art. 5, of By-Laws be stricken from the By-Laws was laid over until the annual meeting. Resolution of Drs. Ridge and Zuill from last annual meeting was also laid over until the next meeting. The Dr. Williams certificate matter was continued until next meeting.

Report of the Board of Examiners: Dr. Pearson thought that though the amount of money allowed by the law was insufficient to cover the expenses of the Board, that the offering of an amendment to the act would jeopardize it. He did not favor offering an amendment at that time. He thought that, inasmuch as the Act was the offspring of the Association, it should take steps to alleviate the board's sufferings until its services were better appreciated. Dr. Harger thought that the Association should give financial aid until legislation could be secured to satisfy that end. Dr. Harger moved that the legislative committee be authorized to take the necessary steps to procure contributions to help defray expenses of Veterinary Medical Examiners. Carried.

Adjourned for luncheon. Called to order at 2 p. m.

Committee on Sanitary Science and Police:—Dr. Pearson chairman, made a verbal report, mainly on the work done by the State Live-stock Sanitary Board. He spoke of an outbreak in Jefferson County of a "Venereal disease," in which the prominent symptoms were, urethritis, ulcers on end and side of penis. In a mare that was covered by an affected stallion, vesicles appeared in the vagina with irritation of the part—cured by creolin injections. The stallion was treated by different veterinarians but without success—he dying about four months after disease was first noticed. He does not think it to be Dourine.

He reported cases of anthrax and "Red Water." Saw about thirty-five cases of glanders. One case reported to him proved to be true rabies. A dog bit other dogs. All dogs known to be bitten were shot, with the exception of one that escaped, afterward went mad, bit other dogs, pigs and steer. The latter went mad; pigs developed similar symptoms; everything bitten by this dog went mad or became rabid. It was traced through five generations of disease, finally quelled by a thorough inspection and destruction of the suspected. A veterinarian of Bloomsburg was bitten, and died three weeks afterward of rabies, neither he nor the physician in charge believing in the Pasteur treatment. Five persons in Allegheny County have died from the disease.

Hog-cholera was a source of great loss in Centre County where between 350 and 400 hogs died. Premises disinfected at the expense of the Board.

Tuberculosis, like the poor, always with us. The Board has examined about 2400 head of cattle and found about 25 per cent affected; in some parts of the State they have not found any tuberculosis, and in other parts have failed to find a herd free from the disease.

Dr. Pearson requested veterinarians to send specimens or parts to the laboratory which the department has equipped at the University of Pennsylvania. He reported a peculiar form of pneumonia in cattle; he doubts whether it is contagious like tuberculosis, but gives no reaction to the tuberculin test. It is a form of chronic catarrhal pneumonia, characterized by the formation of fibrous tissue, affects whole herds, probably due to some local trouble.

Diseases of fowls is given more attention—one of the most important industries. About \$8,000,000. invested in poultry with a production in value of about \$14,000,000. Poultry-yards yield as much as the wheat fields. Ten per cent die annually from disease.

Dr. Pearson is preparing a report for the Secretary of Agriculture; wishes the veterinary profession to report outbreaks of diseases.

A vote of thanks was extended Dr. Pearson for his able report.

Discussion on Reports of Committees:—Dr. Lusson reported a case of rabies where the dog had been with the family for about a week. No bad results followed to the family.

Dr. Hoskins advised the members against the indiscriminate use of the terms hydrophobia, epidemic, as they belong to the human family. Rabies and epizootic are the proper terms.

Dr. Felton reported a case where a puppy had bitten a boy. Dog showed unmistakable symptoms of rabies—boy remains healthy. Cultures made at the bacteriological Department of University of Pennsylvania proved it to be rabies.

Reading of papers being next in order, the Chair called upon Dr. J. C. Michener for his paper on Parturient Apoplexy; Dr. Ross, Parturient Apoplexy; Dr. Allen on Acetanilid; Dr. Felton, Canine Distemper; Dr. Helmer, Homeopathy *versus* Regular Practice; Dr. Hoskins, Pyoxtanin or Methol Violate. The papers were exceedingly interesting and instructive.

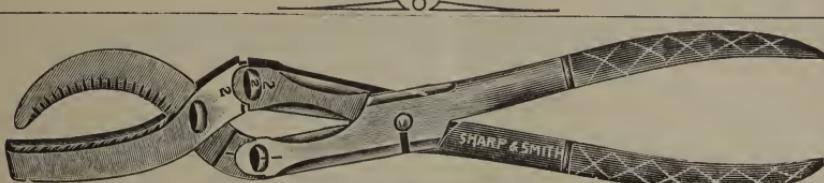
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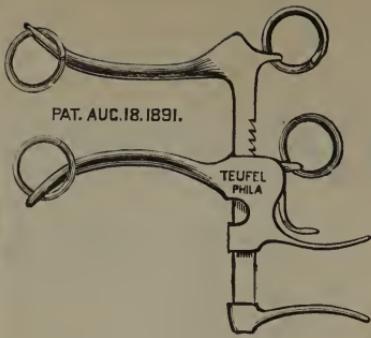
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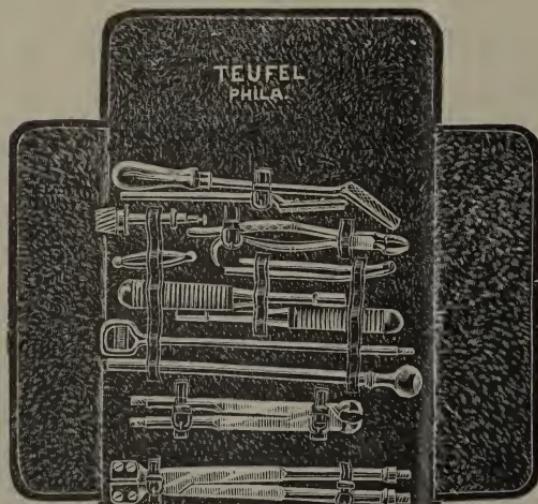
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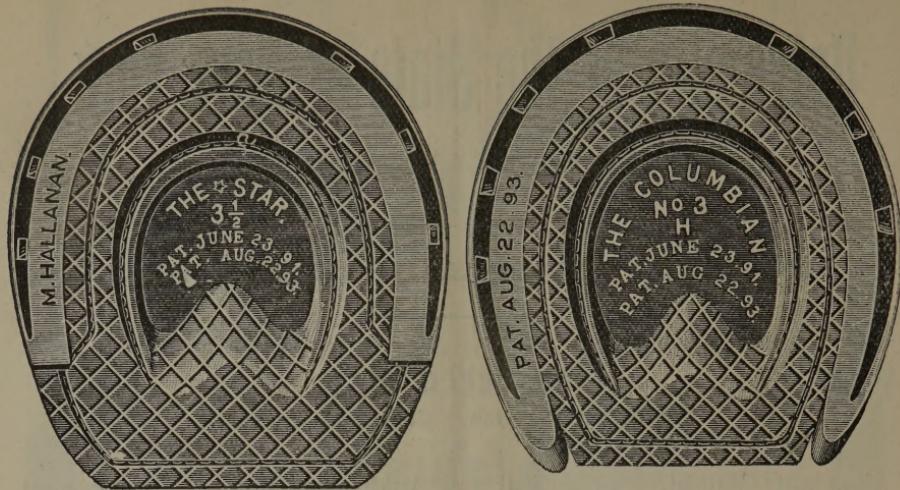
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